Report on the St. Boniface General Hospital/Manitoba Health Community-Based Management of Pregnancy-Induced Hypertension Pilot Project

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REPORT ON THE ST. BONIFACE GENERAL HOSPITAL/MANITOBA HEALTH COMMUNITY-BASED MANAGEMENT OF PREGNANCY-INDUCED HYPERTENSION PILOT PROJECT

September, 1987

EXECUTIVE SUMMARY

The St. Boniface General Hospital, Manitoba Health Services Commission, and Winnipeg Region of Manitoba Health cooperatively developed a home care program for women with mild, non-proteinuric pregnancy-induced hypertension (PIH). Patients were referred to the program by their physician and were supervised on a seven-day-a-week basis by a team of five specially trained public health nurses (PHNs).

It was postulated that assessment of the patient in her home would reduce hospital use, be less costly than hospital-based care, alleviate stress related to family separation, and would be acceptable to patients and care providers.

Over the 15 months of the pilot project which began in April, 1985, 79 patients referred to the program met the pilot project criteria. Upon acceptance into the program the patient was instructed by a PHN in self-monitoring of blood pressure, weight, urinalysis, fetal movement count, and bed rest requirements. The PHN assessed maternal and fetal status and well-being daily, and provided supervision, teaching, case coordination, and referral to other services as required.

Of the 108 patients referred to the program 22 were not accepted because they did not meet the original enrollment criteria. Seven of the remaining 86 patients were excluded from the evaluation because subsequently they were found not to meet the revised program criteria. The 79 patients whose data were evaluated had a median age of 28.4 years and had received a median of 11.8 years of education. A majority were married or living common-law (91.1%), 54.4% were pregnant for the first time and 62.0% had no previous live-born children. Gestational age on entry to the program had an average value of 35.5 weeks. Home help was available to 96.2% of patients, usually from their husbands (84.2%) and often from other relatives as well (27.6%). At the time patients

started on the program 64.9% had had prenatal education for the current or a previous pregnancy.

Forty-two patients were admitted to the program directly after a hospitalization for pregnancy-induced hypertension (PIH) and the remaining 37 were admitted following a visit to their physician at which PIH was diagnosed. Patients were divided into three groups according to their disposition at discharge from the program: 32.9% were discharged home normotensive; 43.0% were admitted to hospital for treatment of PIH, which included early termination of the pregnancy if the mother and/or baby were at risk; and 24.1% were admitted to hospital either in spontaneous labour or for induction or for elective cesarean section approximately at term. Nine patients had repeat admissions to the program.

Overall, the average length of time on the program was 11.3 days, during which patients received an average of 8.1 Public Health Nurse (PHN) visits. Patients were not visited on the days they attended the Satellite Laboratory/Fetal Assessment unit or their physician's office.

Program treatment consisted of bedrest at home of at least ten hours at night and at least five hours during the day which was required to be split into at least two time periods of at least one hour each. Patient's compliance with this requirement was assessed from their own records. Apparently it was difficult for patients to obtain the required amount of rest at night because they only complied with the required ten hours on an average of 43.6% of nights. Compliance with the required five hours of rest during the day was on an average of 73.8% of days. However, if the compliance was calculated as a percentage of the total required hours of night or day rest that the patient obtained while on the program, the figures became 93.8% and 120.8%, respectively, and, if the hours of rest were averaged out over 24 hours, compliance was 101.9%. Therefore, on average, while patients

did not get their rest exactly when they were supposed to, the amount of rest required was achieved.

Patient compliance with monitoring requirements was 94.0% for counting fetal movements, 97.24% for blood pressure measurement and 97.4% for daily weighing. Only one patient was sufficiently non-compliant to justify discharge from the program to hospital. Compliance scores were not related to patient discharge disposition.

Patients' blood pressures were taken at several points through their pregnancy both prior to admission to the program and at every PHN visit while on the program. Mean blood pressures increased an average of 15.56 mm Hg from the baseline value obtained at the patients' first prenatal visit to the time of referral to the program, indicating the onset of PIH. Although there was an average increase in blood pressure from baseline to referral, there was considerable individual variation. While most patients showed an increase in blood pressure there were some whose blood pressure had barely increased by the time of referral and a few whose blood pressure was less on referral than it was at the first prenatal visit. This finding emphasizes the necessity for all relevant patient information to be available on referral so that the program is restricted to those patients with demonstrable PIH.

From referral to the first PHN visit, mean blood pressure dropped an average of 9.17 mm Hg, corroborating the usual finding that blood pressures tend to be elevated when measured in the physician's office. In patients admitted to hospital from the program for treatment of their PIH, mean blood pressure increased from first to last PHN visit whereas in the other groups it decreased, producing a significant difference in mean blood pressure changes between the discharge disposition groups. This finding documents the appropriateness of the patients' management at the time of discharge from the program.

At the time of final hospital admission, note was taken of the number of patients who had developed any complications of PIH. Nine patients developed complications which are generally recognised as either definitely or possibly related to PIH. Oliguria, postpartum hypertension, and antepartum fetal distress each occurred only once, while thrombocytopenia, abruptio placentae, and fulminating PET each occurred twice. Eight of these situations were successfully resolved but, in one of the cases where the placenta abrupted, the baby died shortly after birth from multiple congenital anomalies. No patients developed eclampsia or disseminated intravascular coagulation.

Some of the group of mothers who were admitted to hospital for the treatment of PIH were discharged back to the program and some remained in hospital until they delivered. Therefore, as expected, analysis revealed that patients admitted to hospital for treatment of PIH had a longer antepartum length of stay than either of the other two groups. This group had a mean antepartum length of stay of 3.34 days as opposed to the normotensive and delivery groups which had mean antepartum lengths of stay of 0.68 and 1.26 days respectively. Length of stay post partum did not differ significantly between discharge disposition groups and was an average of 5.27 days for all mothers.

Only one mother was readmitted within six weeks of postpartum discharge. This readmission, which occurred on the day after discharge, lasted less than 24 hours and the reason was not related to the patient's previous PIH.

Type of labour was related to discharge disposition group, there being a greater number of inductions in the group admitted to hospital for treatment of PIH and a greater incidence of spontaneous labour in the remaining groups. Overall, 40.5% of mothers were delivered by cesarean section, 46.8% had spontaneous deliveries and 12.7% forceps deliveries: these percentages were not related to program discharge disposition.

A total of 84 babies were born to the 79 mothers, there being 74 singleton births and five twin births. Average gestational age at delivery was significantly less in the group admitted to hospital for PIH treatment than in the other two groups as was the average birth weight. Seven babies in this group were admitted to the neonatal intensive care unit compared to none in the other groups, and four of the five babies who developed respiratory distress syndrome were also in this group.

Average length of stay for babies was 6.98 days and did not differ between patient discharge disposition groups. All except nine babies were discharged at the same time as their mother and eight of these nine were born to the group of mothers admitted for PIH treatment. Twenty-one babies in all were admitted to the intermediate nursery, six following their stay in NICU and 15 directly after birth, but there was no significant preponderance in any discharge disposition group.

Two infants were readmitted within six weeks of discharge after birth. Neither of the reasons for admission were related to the mother's PIH.

Patient satisfaction with nursing care and teaching was assessed on a scale from one to five. A score of four or more indicated satisfaction. Eighty-two percent of patients were satisfied with the nurse's clinical instruction skills, 76% with the nurses interpersonal skills, and 95% with the nurses specific program instruction skills. Ninety-three percent of patients felt that the number of visits received from the PHNs was appropriate. Compliance with the program requirement for self-monitoring was easy for 86% of patients and keeping doctor's appointments was easy for 89%; however, only 60% of patients found it easy to obtain enough bedrest.

The most frequently reported benefit of being cared for on the program was being at home as opposed to hospital. Patients reported feeling

much more relaxed and comfortable in their own homes and some felt more able to rest and/or less constrained. Care provided by the PHNs was perceived as another benefit of the program. Far fewer difficulties than benefits were experienced by patients, the most frequent difficulty being the conflict between the rest requirements of the program and their household responsibilities. Suggestions for changes to the program were infrequent; however, six patients suggested having a more regular time for visits.

The vast majority of patients reported an adequate support network which was made up of nuclear family and friends. Mean anxiety scores were not related to the patient's condition as indicated by the discharge disposition groups. The average score on the Speilberger State Anxiety Inventory was 32.63 which was lower than the mean of 39.68 obtained from a similar group of patients who were in hospital for PIH.

Program salary costs were estimated from the hours of work reported by the PHNs on their daily time sheets and were found to be $24,650. Costs of equipment, supplies, and homemaker support were $6,644, giving a total cost of $31,294. If one assumes that patients would have been hospitalized for PIH had the program not existed, then a total of 885 hospital days were saved for the 79 patients evaluated. The equivalent cost in salaries and supplies on the antepartum ward at St. Boniface General Hospital would have been $60,525. This figure ignores the considerable hospital overhead and additional physician fees which would have been charged if the patient had been hospitalized. While the costs of operating different hospital wards varies considerably, the overall average operating cost per patient day at St. Boniface General Hospital is $440.

RECOMMENDATIONS

The Technical Advisory Committee recommended that:

1. The Community-Based Management of Pregnancy Induced Hypertension pilot project be established as a perinatal program of Manitoba Health and St. Boniface General Hospital.

2. The criteria for admission of patients to the program be revised to accomodate gravidas of 28 weeks gestation.

3. A mechanism be established to address emergency transfer from home to hospital for those patients on the program who do not have insured ambulance coverage and who cannot pay for such emergency ambulance service.

4. The policies and protocols addressing the referral, admission, management, and discharge of patients on the established program be formalized, and communicated as such, to all relevant medical and nursing staff, hospital and community-based.

5. When adequate and appropriate community health resources are available to support the program, it be expanded to include the Women's Centre.

6. The program services continue to be provided by Public Health Nurses specially trained and skilled in those service activities.

7. When the program is fully established at both St. Boniface General Hospital and the Women's Centre that consideration be made of proposals expanding this community-based antepartum home care program to accomodate gravidas experiencing other complications of pregnancy.

TECHNICAL ADVISORY COMMITTEE

COMMUNITY-BASED MANAGEMENT OF PREGNANCY-INDUCED HYPERTENSION

PILOT PROJECT

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Introduction

The St. Boniface General Hospital in cooperation with the Manitoba Health Services Commission and Winnipeg Region of Manitoba Health developed a home care program for women with mild, non-proteinuric pregnancy-induced hypertension (PIH), referred by obstetricians, to be supervised on a daily basis by specially trained public health nurses. It was postulated that the assessment of the hypertensive patient in her home environment would allow a more critical selection of those patients requiring hospitalization, thus reducing hospital use; would be less costly than hospital-based care; would alleviate stress related to separation from the family, thus improving patient satisfaction; and would be acceptable to patients and care providers.

This home care program for women with PIH was the second phase of a pilot program designed to demonstrate the feasibility of providing community-based, rather than hospital-based, perinatal care. Phase One investigated the feasibility, safety, and acceptability of allowing women, and their infants, who had had a normal labour, delivery, and postpartum course to voluntarily be discharged from hospital within two days after a vaginal delivery and four days following a cesarean birth.

The Steering Committee which guided every stage of Phase One was also involved in the planning and development of Phase Two. After the initial stages of program development were complete, it was suggested that a smaller Technical Advisory Committee be formed to guide the the implementation and evaluation of this 15 month pilot program. This working committee was formed from selected members of the existing Steering Committee and assumed the responsibility of guiding the day to day operation of the pilot program, its evaluation and the preparation of this report.

Review of the Literature

Pregnancy-induced hypertension is a disease primarily of primigravidas (O'Shaughnessy & Zuspan, 1981) characterized by hypertension, proteinuria and/or edema after the 20th week of pregnancy (Wheeler & Jones, 1981). It complicates 5-7% of all pregnancies (Jones, 1979), and can reoccur in 33% of women who have had the disease in a previous pregnancy (Willis, 1982).

Since PIH is a progressive disease, early detection and appropriate intervention to slow the course of the disease is crucial to ensuring a favourable maternal and fetal outcome (O'Shaughnessy & Zuspan, 1981) and "...can help reduce the toll taken in stillbirths, prematurity, and maternal death" (Jones, 1979, p. 92). Delivery of the fetus is the only definitive treatment for PIH (Willis & Sharp, 1982) since delivery of the products of conception ends the disease process (Moodley, 1979).

Pathophysiology

In the mother, an ischemic lesion called capillary endotheliosis develops in the kidneys, involving the glomeruli, and causes the proteinuria of PIH, a late symptom of PIH (Willis, 1982). When edema occurs with PIH, it is usually the first symptom to appear and is generalized, resulting in rapid weight gain (Willis, 1982). Along with excessive weight gain of more than two pounds per week, hypertension is another early sign of pre-eclampsia. An increase of 30 mm Hg or more in systolic or 15 mm Hg in diastolic pressure over the patient's baseline values is significant (Hartley, 1979). A blood pressure value of 140/90 or a significant elevation above baseline should be consistent on at least two occasions six hours apart (Hoffmaster, 1983) in order to diagnose PIH. Fisher (1983) stated that since the three classical presenting signs of PIH may be extremely variable "...hypertension

becomes the key clinical sign from which the physician suspects the diagnosis" (p. 117); hence the necessity of accurate measurements.

Mild pre-eclampsia, which may or may not be accompanied by proteinuria in amounts greater than 5 gms/day or nondependent edema, particularly of face and hands, progresses to severe pre-eclampsia when the blood pressure reaches 160/110 or proteinuria exceeds 5 gms/day, or there is symptomatic evidence of end-organ ischemia (O'Shaughnessy & Zuspan, 1981). Headaches, tremulousness, and vision disturbances reflect CNS damage; epigastric pain, liver damage; oliguria and renal failure, kidney damage; and congestive heart failure, heart involvement (O'Shaughnessy & Zuspan, 1981). Convulsions herald the onset of eclampsia.

Management of PIH

Since the disease process of PIH begins long before signs and symptoms appear (Gant & Worley, 1980), the necessity of early diagnosis and immediate treatment must be emphasized. Zuspan (1978) maintained that all severe forms of PIH should be preventable when the high-risk patient is identified early, seen at frequent prenatal intervals, and hospitalized promptly for bedrest and observation once hypertension appears.

When the disease is mild, i.e., blood pressure less than 160/110 and proteinuria less than 5 gm/day, and the fetus is immature, conservative or expectant management is indicated with modified bedrest in hospital being the treatment of choice (O'Shaughnessy & Zuspan, 1981). In a study of 346 nulliparous women hospitalized on a high risk pregnancy unit at Parkland Memorial Hospital, Dallas, 85% became normotensive after five days in hospital without being confined to bed. The authors (Hauth, Cunningham, & Whalley, 1976) concluded that limited ambulation

and physical activity in hospital combined with astute clinical monitoring of blood pressure, weight gain, renal function, fetal growth, and signs of CNS irritability resulted in a good clinical outcome in the majority of their patients. In-hospital management of these women included ambulation as desired, regular diet without salt restriction, blood pressure measured four times daily, weight and urine spot checks for protein three times weekly, weekly creatinine clearance determinations, and serial sonography to monitor fetal growth.

Fetal assessment tests for monitoring fetal maturity and well-being include: ultrasonography, electronic fetal monitoring which detects abnormalities in the fetal heart rate (FHR), amniocentesis for determining L/S ratio, serial 24 hour maternal estriol excretion measurement in the urine, and daily fetal movement counts. Pearson (cited in Bennett, 1974) suggested that less than 11 fetal movements in 12 hours is an ominous indication of fetal jeopardy. Compared with the considerable expense of 24 hour urinary estriol determinations, Gant & Worley (1980) were impressed by the value of the more simply and inexpensively obtained daily fetal movement counts. They advocated the recording of movements during three to four convenient hours of the day.

Severe disease is heralded by increasing hypertension (blood pressure greater than 160/110), rapid weight gain in excess of two pounds per week, decreasing creatinine clearance, increasing proteinuria and hyperuricemia, clinical symptoms of severe PIH, and clear evidence of fetal growth retardation (Gant & Worley, 1980). Frequent and accurate assessment and observation are the basis on which a nursing care plan is developed, and on which changes are made as required (Wheeler & Jones, 1981). Providing information about the disease, its complications, the treatment plan, and tests which may be conducted, will encourage the patient to follow her treatment program (Sonstegard, 1979).

Several authors have indicated that pregnancy represents a developmental crisis in the life of a woman (Deutsch, 1945; Benedek, 1959; Bibring, 1961; Leifer, 1977) which necessitates adaptation to many lifestyle changes. In addition, the woman with recognized pathology, such as PIH, is confronted with health problems which may necessitate antepartum hospitalization. Hostility and anxiety may be present with hospital placement and may be compounded by being separated from family members. Bedrest is a usual part of the treatment; consequently boredom and depression are added to the emotional picture. Williamson (1981) delineated complications of pregnancy such as pre-eclampsia as producers of stress and anxiety. Kitzinger (1972) ascribed this anxiety to being placed in an alien environment where investigators control every action and are more concerned with pathology than normal birth processes.

Prolonged hospitalization of the patient, even when strict bedrest is not enforced, can be very frustrating. She is separated from her mate and/or children at home and may be worried about them; there may be social problems and limited support for those at home looking after the children. The patient may experience guilt and depression (Williamson, 1981); she may be bored and feel angry at being hospitalized, especially when she does not look or feel sick (Dore & Davies, 1979).

Mild PIH: Hospitalization Versus Home Management

The points of controversy in the management of mild PIH "... involve the place of treatment and the role of bedrest" (Wheeler & Jones, 1981, p. 216). Some physicians want all their patients with mild PIH hospitalized; others allow certain patients to remain at home if they can be closely monitored. Some advise continuous bedrest in the lateral position, while others feel reduced physical activity accomplishes the same results and improves emotional health (Wheeler & Jones, 1981).

The Parkland Hospital study obtained favourable results when patients were allowed limited ambulation, but the average hospital stay was 24 days with the longest stay being 104 days (Jones, 1979). However, Williamson (1981) suggested that patients enter hospital for assessment, a few days to rest and stabilize and then should be allowed to go home, reduce their activity there, and be monitored at frequent intervals on an out-patient basis. Out-patient care, even on a daily basis, is less costly than hospitalization and could be an alternative for many antenatal patients.

A recent British study (Feeney, 1984) presented evidence that supervision of mild pre-eclamptic patients at home by community midwives yielded good perinatal results while decreasing medical costs. Any patient with a diastolic blood pressure of 90-100 mm Hg was visited two to three times weekly by the community midwife who tested urine for protein, measured blood pressure, and reviewed the fetal movement record. The patient was hospitalized immediately if her diastolic blood pressure rose above 100 mm Hg or other signs of worsening PIH appeared. No baby died or had to remain in hospital beyond the usual time.

Admissions for PIH were significantly reduced, and 1123 in-patient bed days were saved over six months. The author concluded that "these results suggest that uncomplicated hypertension in pregnancy is more suitably managed by careful domestic supervision by community midwives than by admission to hospital" (Feeney, 1984, p. 1047).

As early as 1978, a group of physicians practising in the Medway Health District, Britain (Mathews, Shuttleworth and Hamilton, 1978), advocated the home management of patients with uncomplicated hypertension. They managed their patients on an out-patient basis and the women were taught to test their urine for protein and to watch for the premonitory symptoms of eclampsia, i.e., headaches, visual disturbances, epigastric pain, and vomiting. As soon as any of these occurred, the patient was

admitted to hospital immediately. The patient was also taught to report a reduction in fetal activity and, although not instructed to rest in bed, she was advised to curtail her normal home activity. Gant & Worley (1980) in their discussion of home management of the patient with mild PIH and remote from term, pointed out that the biggest disadvantage is the required daily clinic visit which may interfere with the benefits of resting at home.

Advocates of hospital care point out the benefit of close observation within hospital to insure compliance with treatment regimens. Those who advocate home care feel that the psychological benefits derived from home care outweigh the hospital advantage of close supervision. Whether a patient can and will adhere to home treatment programs will be related to the support available to the woman, her motivation, and the amount of information provided. It has been found that well-informed patients are more likely to comply if they understand the rationale.

Today's increasing medical costs and consideration of patient psychological factors make home treatment of non-proteinuric, asymptomatic hypertension an attractive alternative to hospitalization (Willis & Sharp, 1982). In either the hospital or home setting, treatment is the same: frequent rest periods in the lateral recumbent position, and frequent maternal and fetal monitoring (Willis & Sharp, 1982). If home treatment with restricted activity is an option, the patient should be motivated to follow her treatment regimen and should have an adequate support system at home.

The implementation of a home visiting program with specially trained public health nurses to monitor daily patients with mild, non-proteinuric PIH could be a safe, satisfying, and economic alternative to in-hospital care.

Description of the Pilot Program

Orientation of Public Health Nurses

The orientation of the five Public Health Nurses (PHNs) who worked in this program consisted of a combination of 17 hours of didactic sessions, and a 28 hour practicum with hospitalized antepartum patients. Topics covered in the didactic sessions were (a) goals and objectives of the program, (b) hypertension in pregnancy, (c) assessment of fetal well-being, (d) effects of maternal hypertension on the fetus, (e) laboratory tests and the PET/PIH workup, (f) nursing care of patients with PIH, (g) clinical evaluation of PIH, and (h) psychosocial aspects of high-risk pregnancy. Films and videotapes on abdominal palpation and on pre-eclampsia were also used. A learning package on PIH and abdominal palpation required five hours of independent study by each PHN.

The practicum entailed six hours on the Labour & Delivery Unit, ten hours on the Antepartum Unit, three hours in the Fetal Assessment Unit, and eight to ten hours spent in Ambulatory Care Facility - Obstetrics. The purpose of these 17 hours of clinical experience was to have the PHNs gain skill in (a) abdominal palpation of women at various weeks gestation, (b) auscultation of fetal heart rate, (c) measurement of fundal height, (d) estimation of edema, (e) checking of maternal reflexes, (f) estimating frequency of fetal movement, and (g) data collection and recording. An additional three hours on the administrative aspect of the program were provided as the program became operational.

Program Operation

Patient Criteria

Criteria for admission to this program of community-based home care for PIH were developed in consultation with obstetrical staff of the hospital. The criteria initially developed and used were:

1. Scheduled for confinement at St. Boniface General Hospital by an obstetrician.

2. Gestational age of 32 to 38 weeks, as defined on either: (a) the first antenatal visit by the last normal menstrual period and pelvic examination, (b) by two ultrasound examinations done prior to 28 weeks gestation, or (c) by a positive Brevindex prior to six weeks gestation.

3. Systolic blood pressure no greater than 30 mm Hg above the baseline measurement and/or a diastolic pressure no greater than 15 mm Hg above the baseline measurement; baseline was defined as the blood pressure obtained at the first antenatal visit. Patients with a blood pressure recording at or greater than 150/100 mm Hg were not suitable for admission to the program.

4. Proteinuria less than 300 mg/decilitre on AMES dipstick.

5. Absence of headache, scotoma, visual disturbance, and epigastric pain.

6. Absence of marked edema, hyper-reflexia, and clonus.

7. Private residence in Winnipeg within the boundaries of the Perimeter Highway.

8. Home supports available to allow the patient to meet the program requirement of 15 hours of bedrest a day.

During the course of the pilot project several modifications were made in these original criteria:

1. Two family practice medical centres, with high volume obstetrical practice, were allowed to admit patients directly to the program. Other family practice physicians were allowed to refer patients to an obstetrician who could then admit eligible patients to the program.

2. Patients at a gestational age of 30 weeks or more were accepted.

3. Gestational diabetics with PIH, who were not Insulin dependent were accepted.

Intake Process

Referrals of patients to the project came from two sources: physicians' offices or the Antenatal Unit of St. Boniface General Hospital. Following modification of the criterion of who could refer patients to the project, a total of 20 obstetricians and 13 family practice physicians referred patients to the project.

A beeper system was established to facilitate referral intake. One of the five PHNs carried a beeper during regular work hours of 0830 to 1630, Monday through Friday exclusive of statutory holidays. This responsibility was rotated through all five PHNs for one week at a time. Physicians wishing to refer a patient to the program contacted the intake PHN by this beeper system.

On weekends or statutory holidays no referrals were accepted, unless prearranged by the physician, due to staffing limitations.

All eligible participating physicians were initially and periodically notified during the course of the pilot project of the intake process; this was done by distribution of printed, specific program admission criteria and a referral information sheet.

Referral from Physicians' Offices. Physicians were requested to supply patient information to the intake PHN at the time of the referral by their office. The information requested included (a) patient's name, address, and phone number; (b) parity; (c) estimated date of confinement and weeks gestation; (d) booking blood pressure and two readings of current blood pressure taken 10 minutes apart; (e) urine labstick

results; (f) presence of any other signs or symptoms of PIH; (g) any physical, psychosocial or management concerns; and (h) whether the patient was interested in the program. In addition, a copy of the patient's Manitoba Obstetrical Record and Prenatal Scoring Form was requested.

On the basis of this initial phone information the PHN assessed the patient's eligibility for the program, and if eligible the physician was requested to provide the patient with the Patient Information Sheet (Appendix A) prior to her departure from the office.

The Patient Information Sheet described the program and identified it as a pilot project requesting the patient's voluntary participation in completing questionnaires for project evaluation purposes. In those instances when the physician neglected to provide the patient with the Patient Information Sheet the PHN contacted the patient by phone and provided the information.

Referral of Hospitalized Patients. Physicians would usually write a discharge order referring the patient to the program, and the Antepartum Unit nursing staff was responsible for contacting the intake PHN. If, on PHN assessment, the patient did not meet criteria for the program, the hospital nursing staff was responsible for so advising the attending physician. Within the constraints of sufficient advance notice and workload the intake PHN interviewed eligible patients in the hospital prior to their discharge. The purpose of the interview was to assess the patient more thoroughly, and to provide the patient with information about the program. In those instances where the intake PHN could not do an assessment interview the hospital nursing staff was requested to provide the patient with the Patient Information Sheet. The intake PHN kept in regular contact with the Antepartum Unit in order to anticipate potential referrals to the program.

Service Process

When accepted onto the program the patient was assigned to a specific PHN who became the primary nurse for the patient. The patient was visited daily with the first home visit occurring within 24 hours of the PHN receiving the referral. No home visit occurred on the day the patient went to her attending physician's office and to the Fetal Assessment Unit; the assessment done at those sites replaced the nursing assessment done in the home.

First Home Visit. On the first home visit the PHN carried out the following assessments:

1. Nursing history: the Fetal Assessment Unit obstetrical data base (Appendix B) was the guideline used for data collection.

2. Psychosocial/educational: information on the availability and reliability of support person(s) in the home, patient's knowledge base, and of patient's probable compliance level with the regimen of the program were obtained. Appendix C is the educational needs assessment guide used.

3. Clinical status: this included assessment of eight variables:

   a) presence of signs and symptoms of worsening PIH, or of any other complication of pregnancy;

   b) weight;

   c) presence of edema, particularly pretibial (Appendix D is the edema scoring form used);

   d) reflexes, scored by a rating scale (Appendix E);

   e) presence of clonus;

   f) abdominal palpation of fetal position and fundal height, and auscultation of fetal heart rate (FHR) using either a Pinard stethoscope or a fetal Doptone;

   g) urinalysis dipstick to check for presence of protein, ketones, or glucose;

   h) blood pressure readings taken in both sitting and left lateral positions.

Findings of the clinical assessment were recorded on the PHN data flowsheet (Appendix F); a copy of the flowsheet was left with the patient.

Upon completion of this assessment the program protocol and regimen were discussed with the patient, using the patient information booklet, "Community-Based Management of Pregnancy-Induced Hypertension" (Appendix G) as a discussion guide. Critical items covered in the discussion included an overview of the program; frequency and content of PHN visits; the protocol the patient would be expected to follow; and scheduling of weekly visits to the patient's attending physician, Fetal Assessment Unit and Satellite Laboratory. Specific attention was given to teaching the patient about the signs and symptoms of worsening PIH and what action the patient should undertake if she noted these, i.e., contact her physician immediately, or failing that, contact the Labour & Delivery Unit at the hospital. Each patient was provided with a list of important phone numbers to keep by the telephone. The patient was taught when and how to take and record her own blood pressure in the sitting and left lateral position using an electronic sphygmomanometer which was provided by the project. The patient gave a return demonstration until competency in the procedure was ensured.

The patient was given a bottle of Chemstrip 5L urine dipsticks with which she was to test her morning urine. The procedure was demonstrated by the PHN and the patient gave a return demonstration.

A 24-hour urine collection bottle was given to the patient, who was instructed in the method of collecting the specimen. Collection of the once a week specimen was usually scheduled to be completed on the day she was to attend the Fetal Assessment Unit. The specimen, with the appropriate requisition slip, was taken by the patient to the Satellite Laboratory of the hospital, where she also would have any necessary laboratory blood studies done.

The technique for counting fetal movements was taught to the patient. It was stressed by the PHN that if the total fetal movement count for the day was less than 10 the patient was to notify her physician immediately, or failing that, the Labour and Delivery Unit. For any patient who recorded less than 10 fetal movements in a day a nonstress test was arranged to be done at the hospital.

The importance of following the rest and activity guidelines of the protocol was explained. To assist the patient in meeting the rest requirements of five hours of rest during the day and 10 hours at night the PHN discussed rescheduling of household/family activities and the role family supports played in meeting these rest requirements. If a need for additional home support was identified by the PHN, homemaker services were arranged through Family Services of Winnipeg: The cost of this service was paid by Manitoba Health.

Patients were given a chart (Appendix H) on which they recorded their blood pressure readings four times daily; fetal movement counts three times daily; and daily hours of rest, urine test results, and weight. Scales were provided to each patient.

Scheduled visits to the attending physician's office and the Fetal Assessment Unit were monitored by the PHN.

Subsequent Home Visits. On each subsequent daily home visit by the PHN the following were assessed: (a) signs and symptoms of other complications of pregnancy or worsening PIH; (b) presence of edema; (c) fetal heart rate by auscultation; and (d) blood pressure in the sitting and left lateral positions. Fundal height and reflexes were assessed weekly but reflexes were checked more frequently if required.

The patient's recording flowsheet was reviewed with her to ensure self-assessments were being done correctly and were properly recorded.

Patient teaching on self-assessments and recording was provided as required. Some patients had completed prenatal classes, either with this or a previous pregnancy, whereas others were unable to start or continue with a series. This latter group often needed considerable individual teaching on general prenatal topics.

Table 1 summarizes the program activity responsibilities of the patient and the PHN by the frequency of the activity.

Meeting the patient's psychosocial needs was also an important component of the PHN's visits. By virtue of being enrolled in this program these women were now considered at risk and experienced the stresses and anxieties common to this group. They required the opportunity to verbalize their concerns and obtain emotional support from the PHN. If the PHN identified a need for other services, e.g., financial assistance, an appropriate referral was made.

Monitoring Patient Progress. After two to three days on the program, the primary PHN usually called the attending physician to inform him/her of the patient's progress. Additional information was available to the physician from the patient's flowsheet which patients were to bring with them on their scheduled visits.

After three to five days on the program the patient's status was reassessed and a decision was made about her management. One of three options could obtain:

1. The patient was normotensive and was taken off program.
2. The patient remained hypertensive, but within acceptable limits and remained on program.
3. The patient was admitted to hospital if one or more of the reasons for admission was present.

Table 1

Responsibility of Patient and PHN by Frequency of Program Activity

	PATIENT		PHN	
	Daily	Weekly	Daily	Weekly
Blood Pressure Measurement	x		x	
Weight	x			
Urinanalysis	x			
Fetal Movement Count	x			
Bed Rest	x			
Patient Flowsheet Review			x	
Fetal Heart Rate			x	
Edema Check			x	
S & S of PIH/other complications			x	
Fundal Height				x
Reflexes Check				x & PRN
Patient Teaching			PRN	
MD Office Visit		x		
Fetal Assessment Unit Visit		x		
Satellite Laboratory Visit		x		
24-Hour Urine Collection		x		

The decision as to which management option was appropriate was made jointly by the physician at the Fetal Assessment Unit and the attending physician, with input from the PHN. Admission of a patient on the program to the hospital was based on one or more of the following:

1. Inability of patient to comply with: (a) recording of blood pressure, (b) bedrest of 15 hours per day, and (c) recording fetal movements.
2. Patient request to receive hospital rather than community care.
3. Nursing assessment of problematic psychosocial status or home support system.
4. Systolic blood pressure greater than or equal to 150 mm Hg in sitting position or 140 mm Hg in left lateral position.
5. Diastolic blood pressure greater than or equal to 100 mm Hg in sitting position or 90 mm Hg in left lateral position.
6. Proteinuria greater than 600 mg% on a 24-hour urine collection.
7. Presence of headache, scotoma, visual disturbances, or epigastric pain.
8. Weight gain greater than 0.5 kg/day or 2 kg per week.
9. Significant increase in dependent edema as judged by the PHN or physician.
10. Presence of hyper-reflexia or clonus.
11. Sudden decrease in fetal movements or less than 10 movements in 12 hours.
12. Abnormal real time fetal assessment: biophysical score of 6 or less.
13. Abnormal hematology or biochemistry: uric acid greater than 380 ml/L; platelet count less than 100,000.
14. Gestational age at or greater than 40 weeks in patients with persistent PIH.
15. Clinical judgement of the attending obstetrician/general practitioner.

The decision to admit a patient to hospital could be made at any time, should the patient's condition warrant it. The patient's attending physician was notified, either by the PHN or by the patient herself, when time permitted. If an urgent situation arose, the patient was instructed to go directly to the Labour and Delivery Unit at the hospital via her own transportation or by ambulance, depending on the situation.

Communication with the District PHN. When the patient was accepted onto the program, the PHN would notify the Public Health Office of the District in which the patient resided (Appendix I). A similar notification would occur when the patient was discharged from the program. A more comprehensive referral was made in those situations where ongoing community follow-up was needed.

Methods

The data required to evaluate the various aspects of patient outcome were determined by members of the Steering Committee and several data collection forms and patient questionnaires were developed. Patient data were collected daily by the PHN, using the PHN's Flowsheet (Appendix F) and also by the patient, using the Patient's Recording Chart (Appendix H). These data determined the patient's status with respect to the signs and symptoms of PIH, and her degree of compliance with program requirements for rest and self-monitoring.

An evaluation form (Appendix J) was constructed and used to collect background sociodemographic information and medical data. The latter came from several sources and tracked the patient's medical status from the first prenatal visit at her physician's office through referral to, admission to, and discharge from the program to final hospital admission, delivery, and postpartum discharge. Conjoint responsibility for completion of this form resided with the PHN and the Research Assistant for this pilot project.

The Research Assistant telephoned patients on their third program day in order to seek consent to and make an appointment for a home visit between the fourth and sixth program day. The purpose of this visit was to have the patient complete three questionnaires (Appendix K): (a) The Speilberger State Anxiety Questionnaire (Form Y) (1983); (b) a Support Scale which was developed for this project; and, (c) a modified version of the Risser Patient Satisfaction Scale (1975). After receiving permission from the author of the latter scale, 14 items were selected from two of the three subscales - the "Trusting Relationship" and "Educational Relationship" subscales - and minor wording changes were made to three items (see Appendix K). Due to the nature of the PIH program, the "Technical Professional" subscale was not felt to be appropriate.

PHNs kept daily time-sheet records (Appendix L) of the amounts of time spent in various program activities. Guidelines were provided for the completion of these records (included in Appendix L).

A protocol (Appendix M) was developed which designated the data collection schedule and PHN and Research Assistant responsibilities in relation to the patient's progress and program activities.

The information on all data collection forms and questionnaires was entered directly into computer data files using the SAS Full Screen Product and analyzed using SAS statistical programs.

Results and Discussion

Patient Outcome

A total of 108 patients were referred to the program. Of these, 22 were not accepted because they did not meet the criteria. The remaining 86 patients were accepted for monitoring on the program on the basis of the referral information provided to the PHNs. Data collected from seven of these 86 were excluded in the evaluation of patient outcome. The reasons for exclusion varied: two patients were too obese to monitor their own blood pressure satisfactorily; one patient did not have the means to drive or be driven to her appointments with her physician, the Fetal Assessment Unit, or Satellite Laboratory and it was decided that taking the bus was too much activity, additionally, the patient was completely non-compliant with the program rest and self-monitoring requirements; two patients went to hospital in labour before the first home visit; one patient's blood pressure was found to be higher than the program cut-off value at the first PHN visit; and one patient was withdrawn from the program because her physician felt that she would not comply with the program regime.

Sociodemographic Information

The 79 patients who were evaluated were between 17 and 40 years old, with a median age of 28.4 years; they had received between six and 19 years of education, with a median of 11.8 years; 72 (91.1%) were married or living commonlaw; 43 (54.4%) were pregnant for the first time and 49 (62.0%) had no previous live-born children. Gestational age at first admission to the program varied between 28 weeks six days and 40 weeks, with a mean of 35.5 weeks. Home help was available to 96.2% of patients, usually from their husbands (84.2%) and often from other relatives as well (27.6%). The remaining three patients who did not have any home help were on the program for two days or less.

Of the 49 patients who would be primiparous at the termination of their current pregnancy, 65.2% were either currently attending prenatal classes or had completed the course, 4.3% stopped attending while on the program, 4.3% planned to attend, and 26.1% did not plan to attend prenatal classes. The percentages with an interest versus no interest in prenatal education were approximately reversed for multigravid patients: 25.0% were taking or had completed prenatal classes, 10.7% planned to attend, and 64.3% did not plan to attend. Of this 64.3% only one-third had taken prenatal classes for a previous pregnancy. Thus, at the time patients started on the program, 26 of the 74 patients on whom information was available had not had any prenatal education for the current or a previous pregnancy.

Patient Referral and Program Discharge Disposition

Forty-two patients, which included six non-insulin-dependent gestational diabetics, were admitted to the program directly from a hospitalization for PIH. Of these 42 patients, 12 (28.6%) were eventually discharged off the program normotensive; however two of them were readmitted subsequently to the program. Thirty (71.4%) of the 42 were discharged off the program to hospital for one of the following reasons: (a) monitoring or treatment of PIH, which could include early termination of the pregnancy because the mother and/or baby were at risk; (b) spontaneous delivery; or (c) induction or elective cesarean section approximately at term. Five of the women admitted to hospital for monitoring or treatment of PIH were readmitted to the program following discharge from hospital.

The remaining 37 of the 79 patients, which included one other non-insulin-dependent gestational diabetic, were admitted to the program following a visit to their physician's office at which PIH was diagnosed. Five of this group had been hospitalized previously for PIH. Thirteen (35.1%) were discharged off the program normotensive: however one was readmitted to the program following a hospital admission.

Twenty-four (64.9%) were admitted to hospital for one of the three reasons given above. One of the 24, who was admitted to hospital for PIH treatment, was readmitted to the program on discharge from hospital.

Three groups of patients were created based on the reason for termination of the home care program. Group 1 were those discharged normotensive, Group 2 were those admitted to hospital because of worsening signs and symptoms of PIH, and Group 3 were those who delivered at or close to term either spontaneously or as a result of induction or elective cesarean section. Thus, of those 42 patients admitted to the program from hospital, 28.6% fell into Group 1, 45.2% into Group 2, and 26.2% into Group 3; of those 37 patients admitted to the program following a physician visit 35.1% fell into in Group 1, 43.2% into Group 2 and 21.6% into Group 3. Patient location at referral and readmissions for the three discharge disposition groups appear in Table 2.

Even though a larger number of readmissions to the program were seen in the group of patients who were originally admitted to the program from hospital, this number was not significantly greater than that seen in the group of patients originally admitted to the program from home, probably because the proportion of readmissions was small.

Of the 25 patients who were discharged from the program normotensive there were only six whose records showed further evidence of PIH. As already indicated three patients were readmitted to the program but an additional three were admitted to hospital and induced because of elevated blood pressures. Among the remaining 19 patients six were induced, one because she was post dates and the other five for no available recorded reason; two had elective cesarean sections and 11 went into spontaneous labour.

TABLE 2

PATIENT LOCATION AT REFERRAL AND READMISSIONS TO THE PROGRAM BY PROGRAM DISCHARGE DISPOSITION

	DISCHARGED TO:		
	HOME NORMOTENSIVE	HOSPITAL FOR PIH TX	HOSPITAL FOR DELIVERY
ADMITTED FROM HOSPITAL n=42	12	19	11
READMITTED TO PROGRAM	2	5	
ADMITTED FROM PHYSICIAN'S OFFICE n=37	13	16	8
READMITTED TO PROGRAM	1	1	

Program Length of Stay

First admissions to the program had an average length of 9.80 days during which time patients received an average of 7.13 visits from a PHN. Patients were not visited on the days they attended the Satellite Laboratory/Fetal Assessment Unit or their physician's office. Repeat admissions to the program had an average duration of 12.78 days and patients received an average of 8.22 PHN visits. Overall the average number of days on the program and PHN visits were 11.25 and 8.06, respectively.

Pilot Project Costs Versus Potential Savings in Hospitalisation.

If one assumes that patients would have spent their days on the program in hospital had the program not existed, then a total of 885 hospital days were saved for the 79 patients evaluated. An estimated cost for salaries and supplies per patient day on the St. Boniface General Hospital's antepartum ward was obtained from the hospital and found to be $68.39. Thus the hospital salaries and supplies costs which would have been generated by the pilot project patients had they been hospitalized instead was found to be $60,525.15. On the other side of the ledger, total expenditure in PHN salaries can be obtained from the total hours worked for the pilot project patients, i.e., 1387.25 hours. The hourly salary of each PHN who worked on the pilot project was determined and multiplied by the number of hours worked. This produced a total salary cost for the pilot project of $24,650.44. Both the hospital and the PHN salary costs are based on 1986/87 figures.

Clearly, in salaries and supplies alone the home care program is cheaper than hospitalization. However, other hospital-associated costs, such as the considerable hospital overhead, are also eliminated by home care. The overall average cost of a patient day in St. Boniface General Hospital has been calculated to be $440.00: Capital costs were excluded from this figure. Certain physician fees are also eliminated by community care rather than hospitalization. When a woman receives her

prenatal care in the community, her physician is remunerated by a block fee which covers her prenatal care, delivery and postpartum physician visits, regardless of the number of visits required. However, if a woman is hospitalized for complications of pregnancy, her physician may bill for daily hospital visits in addition to the block fee.

Patient Compliance

Program treatment consisted of bedrest at home for at least ten hours at night and at least five hours during the day. Daytime rest was required to be split into at least two time periods of at least one hour each. Patient's compliance with these requirements was assessed from their own records. The range of average hours of rest obtained while on the program was 2:20 - 14:00 hours for daytime rest and 5:55 - 11:00 for nighttime rest. A priori it could be expected that successful maintenance on the program would depend on the patient's compliance with program treatment, i.e., bed rest at home. In fact, neither patient disposition nor admission from hospital versus physician's office was related to patients' overall compliance with bed rest or monitoring requirements. Table 3 gives the means and standard deviations for each measure of compliance.

Apparently it was difficult for patients to obtain the required amount of rest at night because they only complied with the required ten hours on an average of 43.6% of nights. Compliance with the required five hours of rest during the day occurred on an average of 73.8% of days. However, if the compliance was calculated as a percentage of the total required hours of night or day rest that the patient obtained while on the program, the figures became 93.8% and 120.8%, respectively, and, if the hours of rest were averaged out over 24 hours, compliance was 101.9%. Therefore, on average, while patients did not get their rest exactly when they were supposed to, the amount of rest required was acheived.

TABLE 3

MEAN COMPLIANCE SCORES PERCENT

COMPLIANCE WITH:-	MEAN	STANDARD DEVIATION
Fetal Movement Recording	94.01	10.71
Blood Pressure Recording QID	97.24	5.11
Weight Recording	97.41	12.47
Night time Rest - percent days[1]	43.60	36.29
Night time Rest - percent hours[2]	93.75	8.64
Day time Rest - percent days[1]	73.76	35.16
Day time Rest - percent hours[2]	120.76	37.32
24-hour Rest - percent hours[2]	101.89	10.48

[1] These compliance values refer to the percentage of days on the program on which a patient obtained at least the minimum required bed rest.

[2] These compliance values refer to the total number of hours rest obtained on the program as a percentage of the minimum total required hours.

For example, if a patient had been on the program for one week, she should have had a total of 70 hours of rest at night and 35 hours of rest during the day. If she took 9 hours of rest each night and 6 hours of rest each day, then her compliance with the required nightly rest would have been zero because she took less than 10 hours of rest each night, and her compliance with the required daily rest would have been 100% because she took more than five hours of rest each day. If instead compliance was calculated as the percentage of total hours of rest obtained, then her night rest compliance would have been 63/70=.9 or 90% and her day rest compliance 42/35=1.2 or 120%. Over a 24 hour period she would have obtained 15 hours of rest making her compliance exactly 100% when calculated 24-hourly.

Patient compliance with monitoring requirements was 94.0% for counting fetal movements, 97.24% for blood pressure measurement and 97.4% for daily weighing. Only one patient was sufficiently non-compliant to justify discharge from the program to hospital.

Blood Pressures

With regard to blood pressure values, the position was taken that it was the changes in blood pressure through the sequence from baseline to referral to first PHN visit to last PHN visit which were important, rather than the absolute values at any one of these steps. Consequently, analysis of blood pressure values looked at the differences between each of these steps both separately and as a complete package. Mean blood pressure values (mean BP values) for each patient were computed according to the equation:

$$\text{MEAN BP} = \text{DIASTOLIC BP} + \frac{(\text{SYSTOLIC BP} - \text{DIASTOLIC BP})}{3}$$

which approximates the average blood pressure over the cardiac cycle. These values were used in subsequent analyses. Table 4 illustrates the changes in mean blood pressures over the entire sequence from baseline to postpartum discharge for each of the groups of patients.

Blood pressure differences were analysed using both multivariate and univariate analysis of variance. In a multivariate analysis of variance (MANOVA) all dependent variables are analysed simultaneously for significant group differences, whereas a univariate ANOVA analyses each dependent variable separately to determine if there are significant group differences. The MANOVA adjusts for any redundancies in the relationships between the independent variables and each of the dependent variables.

TABLE 4

MEAN BLOOD PRESSURES - BASELINE, ON REFERRAL TO PROGRAM, AT THE FIRST AND LAST PUBLIC HEALTH NURSE VISIT AND AT POST PARTUM DISCHARGE

		ADMITTED FROM DR.'S OFFICE			ADMITTED FROM HOSPITAL		
		GROUP 1	GROUP 2	GROUP 3	GROUP 1	GROUP 2	GROUP 3
1	Baseline - ?[1]	102.00	82.71	89.20	87.20	94.75	89.00
	N	(5)	(7)	(5)	(5)	(12)	(8)
2	Baseline - sitting	90.25	88.38	94.33	87.57	92.67	97.50
	N	(8)	(8)	(3)	(7)	(6)	(2)
3	Baseline[2]	93.58	85.73	91.13	87.41	94.06	90.70
	N	(12)	(15)	(8)	(12)	(18)	(10)
4	Referral[3]	101.46	107.20	106.00	103.08	111.24	106.27
	N	(13)	(15)	(8)	(12)	(17)	(11)
	Sitting BP						
5	First Visit	92.23	101.56	102.25	92.75	99.89	93.64
6	Last Visit	87.31	104.69	94.75	90.83	104.84	91.09
	N	(13)	(16)	(8)	(12)	(19)	(11)
	Left Lateral BP						
7	Referral	82.10	91.90	85.20	86.27	93.00	95.60
	N	(10)	(10)	(5)	(11)	(16)	(10)
8	First Visit	80.00	90.13	93.75	82.50	86.16	79.23
9	Last Visit	75.62	94.13	91.25	80.00	92.16	78.00
	N	(13)	(16)	(8)	(12)	(19)	(11)
	Post partum						
10	discharge	88.62	92.18	85.63	95.37	98.68	92.30
	N	(13)	(16)	(8)	(12)	(19)	(11)

[1] ? indicates that, for the patients whose data were used to calculate the means in line 1, the PHNs were unable to ascertain the position in which the baseline blood pressure had been taken.

[2] The mean blood pressures given in line 3 were calculated by combining those blood pressure values known to have been taken in the sitting position (line 2) with those where the position was in question (line 1).

[3] Similarly, three of the referral blood pressures were taken in an unknown position but these were included with the sitting blood pressures when calculating the means in this line of the table.

A MANOVA was conducted on the following dependent variables: (a) referral-baseline mean blood pressure difference (line 4 minus line 3 in Table 4), (b) referral-first PHN visit mean blood pressure difference (line 4 minus line 5 in Table 4), and (c) first-last PHN visit mean blood pressure difference (line 6 minus line 5 in Table 4). The independent variables were patient discharge disposition, i.e., Group 1, Group 2, or Group 3 and site of referral to the program, i.e., hospital or physician's office. Only discharge disposition was significantly related to the dependent variables as a group ($F=7.19$, $p=.0001$).

Analyses of variance (ANOVA) were conducted on the above three dependent variables separately in order to determine which of the blood pressure differences contributed to the overall discharge disposition group difference noted in the MANOVA. The significance levels for these and all subsequent analyses were set at .01 rather than the customary .05 value so as to effect some control of "experimentwise" error. No significant effects were noted for the difference in blood pressure between baseline and referral to the program nor were there any significant effects for the difference between referral and first PHN visit. Overall, the mean increase in blood pressure from baseline to referral was 15.56 mm Hg (95% confidence interval for the population mean is 12.73-18.38 mm Hg) and the mean decrease in blood pressure from referral to first visit was 9.17 mm Hg (95% confidence interval for the population mean is 6.74-11.61 mm Hg).

Although there was an average increase in blood pressure from first prenatal physician visit to the time of referral to the program, reflecting the onset of PIH, there was considerable individual variation: Most patients showed an increase in blood pressure but there were some whose blood pressure was almost the same on referral as it was at baseline and a few whose blood pressure was <u>less</u> on referral than it was at the first prenatal visit. This finding emphasizes the necessity

for all relevant patient information to be available on referral so that the program is restricted to those patients with demonstrable PIH. Since the time from referral to first home visit was at most 24 hours, the average reduction in blood pressure between these two measurements reflects the often noted fact that blood pressures tend to be elevated in the physician's office or in the hospital setting.

There was a significant relationship between discharge disposition and the differences in both sitting and left lateral mean blood pressures from first to last PHN visits ($F=12.44$, $p=.0001$; $F=7.41$, $p=.0012$, respectively). Patients discharged to hospital for treatment of their PIH (Group 2) showed an increase in both sitting and left lateral mean blood pressures of 4.11 mm Hg and 5.09 mm Hg, respectively, over their course on the program. However, patients discharged either normotensive (Group 1) or for delivery (Group 3) showed decreases in both pressures: a reduction of 3.48 mm Hg on both pressures for the normotensive group and reductions of 4.63 mm Hg in sitting and 2.05 mm Hg in left lateral mean blood pressures for the delivery group. These blood pressure differences support the appropriateness of the patients' management at the time of discharge from the program.

Blood pressures taken at the time of postpartum discharge appear in the last line of Table 4. The position of patients when these pressures were taken varied and it is, therefore, probably not appropriate to aggregate the data; however, patients were lying down in the majority of cases. Table 5 shows the averages of the mean postpartum blood pressures for each position. With the exception of those patients who were admitted to the program from their physician's office and who were discharged to hospital for PIH treatment or delivery, the postpartum blood pressures were higher than the last home visit blood pressures taken in the left lateral position.

TABLE 5

POSTPARTUM MEAN BLOOD PRESSURES BY PATIENT POSITION

POSITION	MEAN BLOOD PRESSURE	N
LEFT LATERAL	95.48	20
LYING	92.33	30
SUPINE	93.42	12
SITTING	98.27	5
NOT NOTED	87.11	12

Antihypertensive and Anticonvulsant Requirements

Twelve patients received antihypertensives upon final admission to the hospital, nine while on the program, three prior to 28 weeks gestation and five prior to pregnancy. It should be noted that patients who had required antihypertensives earlier on did not necessarily require them later and vice versa (see Table 6).

Five patients received anticonvulsants upon final admission to hospital: three of the five were on an experimental Dilantin protocol which was being tested at the hospital during their admission. One of the five had a prior history of epilepsy for which she had been receiving oral anticonvulsants while on the program and she continued to take the same medication while in hospital.

Symptoms of PIH

At each home visit the PHN was required to ask if the patient had experienced any headache, visual disturbance or epigastric pain. Also the patient's reflexes were checked weekly, or more often if indicated, for any sign of hyperreflexia or clonus. The presence or absence of each of these symptoms of PIH was noted specifically at the time of hospital admission. Eight patients had an initial hospitalization for PIH prior to the final admission which culminated in delivery. Information on the presence or absence of these symptoms at the time of hospital admission from the program was available on 69 patients and is presented in Table 7. Twenty-five patients gave evidence of one or more of the above symptoms: 16 had one symptom, six had two symptoms and three had three symptoms. Patients who had two admissions to hospital from the program reported symptoms on one of their hospital admissions only. Having one or more symptom was not related to patient discharge disposition group; however, the three patients with three symptoms were all discharged to hospital for PIH treatment.

TABLE 6

PATIENTS' ANTIHYPERTENSIVE AND ANTICONVULSANT REQUIREMENTS

	ANTIHYPERTENSIVES					ANTICONVULSANTS		
ID	PRIOR TO PREGNANCY	PRIOR TO 28 WEEKS	PROGRAM	HOSPITAL PIH TX	HOSPITAL FINAL	PROGRAM	HOSPITAL PIH TX	HOSPITAL FINAL
NORMOTENSIVE								
16					X			
18		X	X					
29	X	X	X					
56					X			
PIH TREATMENT								
5					X*			X*
12					X			
73	X							
3			X		X*			
28			X		X*			
34			X		X*			
38			X		X*			
39	X				X			
67	X	X	X	X	X			
76								X
81								X*
84								X*
DELIVERY								
23	X		X		X			
2						X		X
64			X		X			
TOTAL	5	3	9	1	12	1	0	5

* Administered parenterally.

TABLE 7

SYMPTOMS REPORTED AT THE TIME OF HOSPITAL ADMISSION

ID	ADMISSION	HEADACHE	VISUAL DISTURBANCE	EPIGASTRIC PAIN	HYPER-REFLEXIA	TOTAL SYMPTOMS
			NORMOTENSIVE			
29	1		X			1
48	1				X	1
50	1	X				1
53	1	X				1
58	1				X	1
61	1				X	1
74	1	X	X			2
78	1	X	X			2
			PIH-TREATMENT			
1	1	X	X			2
5	1	X		X	X	3
12	1				X	1
31	1	X	X	X		3
39	1	X	X	X		3
43	1		X			1
51	1			X	X	2
70	1				X	1
77	1			X		1
81	2		X			1
82	1				X	1
84	1	X		X		2
			DELIVERY			
2	1	X				1
13	1	X				1
32	1	X		X		2
40	1		X			1
45	1		X			1
TOTAL		12	10	7	8	37

Complications of PIH

A record was made of any complications which developed during the course of each patient's pregnancy. The three serious complications which were anticipated and therefore noted specifically on the evaluation form were eclampsia, disseminated intravascular coagulation and oliguria. Nine patients developed complications which are generally recognised as definitely or possibly related to PIH and eight of the nine were in the group admitted to hospital for the treatment of PIH. None developed eclampsia or disseminated intravascular coagulation, but one patient did develop oliguria. The remaining complications are listed in Table 8.

Labour and Delivery

Type of labour was related to discharge disposition group (χ^2=12.201, p=.016), there being a greater number of inductions in the group admitted to hospital for treatment of PIH and a greater incidence of spontaneous labour in the other two groups (see Table 9). Cesarean section was the most frequent delivery method in the group of patients admitted to hospital for treatment of PIH and spontaneous vaginal delivery was most frequent in the remaining two discharge disposition groups; however, this difference was not significant. Overall, there were 32 cesarean sections (40.51%), 37 spontaneous vaginal deliveries (46.84%) and 10 forceps deliveries (12.66%). Only 12 of the patients having cesarean sections experienced no labour, while 7 went into spontaneous labour and 12 were induced. (Information on type of labour was missing for one of these patients.)

Neonatal Outcome

A total of 84 babies were born to the 79 mothers, there being 74 singleton births and five twin births. Average gestational age at delivery and consequently average birthweight were both significantly less in the group admitted to hospital for PIH treatment than in either of the other two groups (using Scheffé's post hoc test with alpha set at .05). Means on both variables are presented in Table 11 together with

TABLE 8

COMPLICATIONS NOTED AT THE TIME OF FINAL HOSPITAL ADMISSION

ID	COMPLICATION
	----------NORMOTENSIVE----------
56	Postpartum hypertension
	----------PIH TREATMENT----------
3	Antepartum fetal distress
5	Thrombocytopenia
7	Abruptio placentae
38	Oliguria
68	Fulminating PET - emergency C/S
73	Abruptio placentae
84	Fulminating PET
86	Thrombocytopenia

TABLE 9

TYPE OF LABOUR BY DISCHARGE DISPOSITION GROUP

DISCHARGE DISPOSITION	TYPE OF LABOUR			
	SPONTANEOUS	INDUCED	NO LABOUR	
NORMOTENSIVE	11	11	3	25
PIH TREATMENT	5	21	8	34
DELIVERY	11	7	1	19
	27	39	12	

TABLE 10

TYPE OF LABOUR BY DELIVERY METHOD

DELIVERY METHOD	TYPE OF LABOUR			
	SPONTANEOUS	INDUCED	NO LABOUR	
SPONTANEOUS	17	20	0	37
FORCEPS	3	7	0	10
C SECTION	7	12	12	31
	27	39	12	

TABLE 11

NEONATAL OUTCOME BY MOTHER'S PROGRAM DISCHARGE DISPOSITION GROUP

	NORMOTENSIVE GROUP 1 N=27	PIH TX GROUP 2 N=38	DELIVERY GROUP 3 N=19
GESTATIONAL AGE AT DELIVERY (WEEKS)	39.206	37.461	38.895
BIRTHWEIGHT (GRAMS)	3320	2821	3530
LOS IN NICU (DAYS)	0	1.730	0
# ADMITTED	0	7	0
LOS INTERMEDIATE (DAYS)	0.556	2.838	0.316
# ADMITTED	5	14	2
POSTPARTUM LOS (DAYS)	4.926	9.216	5.526

other neonatal outcome variables. Seven babies in this group were admitted to the neonatal intensive care unit (NICU) compared to none in the other groups. One of these babies died because of multiple congenital anomalies (trisomy 18). Four of the five babies who developed respiratory distress syndrome were also in this group (the other was in the normotensive group).

Twenty-one babies in all were admitted to the intermediate nursery but there was no significant preponderance in any discharge disposition group. Six of these babies were admitted following their stay in the NICU and the remainder were admitted directly after birth. Reasons for admission to NICU and intermediate nurseries, as recorded on the infant's chart, appear in Tables 12 and 13 respectively.

Maternal and Neonatal Length of Stay (LOS)

Some of the group of mothers who were admitted to hospital for the treatment of PIH were discharged back to the program and some remained in hospital until they delivered; therefore antepartum length of stay in hospital was determined for all patients separately from postpartum length of stay. As expected, analysis revealed that patients admitted for treatment of PIH had a longer antepartum length of stay than either of the other two groups. Group 2 had a mean antepartum length of stay of 3.34 days as opposed to Group 1 and Group 3 which had mean antepartum lengths of stay of 0.68 and 1.26 days respectively. The difference between Group 1 and Group 2 was significant but the other pairwise comparisons between groups were not. Length of stay post partum did not differ significantly between discharge disposition groups and was an average of 5.27 days for all mothers.

Average length of stay for babies was 6.98 days (excluding the baby who died) and was not significantly longer in the group admitted for PIH treatment than for the remainder. All except nine babies were discharged

TABLE 12

REASONS FOR ADMISSION TO THE NICU

ID	REASON
7	Multiple congenital anomalies - Trisomy 18.
28	Preterm with neonatal jaundice
57	Moderate hyaline membrane disease at 36 weeks (1st twin)
57	Premature at 36 weeks, transient tachypnea of newborn, hyperbilirubinemia (2nd twin)
68	Preterm 30-31 weeks with moderate hyaline membrane disease
73	Premature, borderline intrauterine growth retardation, hyaline membrane disease, grade II intraventricular hemorrhage, mild elevation of alkaline phosphatase, mild physiologic jaundice
86	Premature at 35 weeks with transient tachypnea of newborn

TABLE 13

REASONS FOR ADMISSION TO THE INTERMEDIATE NURSERY

ID	REASON
3	Slightly premature at 36-37 weeks
6	Loose watery stools, for isolation and cultures, poor breast-feeding, all cultures negative
10	Tachypnea of newborn, antibiotics for treatment of pneumonia (wet lung)
16	Increased temperature, on antibiotics
28	Preterm with neonatal jaundice
37	Transient hypoglycemia and hypocalcemia
38	Prematurity (1st twin)
38	Prematurity (2nd twin)
42	Prophylactic antibiotic coverage re. maternal temperature
43	Prematurity, query intra-uterine growth retardation
46	Transient tachypnea of newborn, hyperbilirubinemia
48	Asphyxiated infant, mild respiratory distress syndrome, antibiotic coverage for elevated temperature
50	Prophylactic antibiotics due to maternal sepsis, discharged in 48 hours
55	Elevated temperature, diagnosis - group B streptococcal infection, treatment with antibiotics
57	Moderate hyaline membrane disease at 36 weeks (1st twin)
57	Premature at 36 weeks, transient tachypnea of newborn, hyperbilirubinemia (2nd twin)
59	Meconium aspiration
68	Preterm 30-31 weeks with moderate hyaline membrane disease
73	Premature, borderline intrauterine growth retardation, hyaline membrane disease, grade II intraventricular hemorrhage, mild elevation of alkaline phosphatase, mild physiologic jaundice
76	Small for gestational age, borderline hypoglycemia, depressed at birth
86	Premature at 35 weeks with transient tachypnea of newborn

at the same time as their mother and eight of the nine were born to the group of mothers admitted for PIH treatment.

Readmissions

Only one mother was readmitted to hospital within six weeks of discharge post partum. This readmission occurred on the day after discharge and the patient was admitted and discharged on the same day. The ICD9 CM code indicated "Bone or joint disorders of the back, pelvis or lower limb" as a "postpartum condition or complication." Clearly this is not related to PIH.

Two infants were readmitted within six weeks of discharge after birth. One was readmitted seven days after initial discharge for one day because of "Other or unspecified non-infectious gastroenteritis and colitis." The other infant was readmitted 32 days after initial discharge for seven days as a result of "Dermatitis due to food." Both of these conditions are common and not related in any way to the mother's PIH or its treatment.

Patient's Response to the Program

Of the 79 patients whose data were included in the evaluation, 55 received home visits from the research assistant. Several patients were not on the program for a long enough time to receive this visit and a few refused because of language difficulties. Consequently patient satisfaction, anxiety, and support network data are available on 55 mothers only.

Patient Satisfaction

Responses to the first 23 items of the patient satisfaction questionnaire are given in Table 14. The first seven questions were used to ascertain the degree of satisfaction with the clinical

TABLE 14

RESPONSES TO THE PATIENT SATISFACTION QUESTIONNAIRE
PERCENTAGE OF PATIENTS GIVING EACH RESPONSE

	Strongly Agree	Agree	Un-decided	Dis-agree	Strongly Disagree
1. The nurse explains things in simple language.	58.2	41.8	0.0	0.0	0.0
2. It is always easy to understand what the nurse is talking about.	58.2	36.4	1.8	3.6	0.0
3. The nurse asks a lot of questions but once she finds the answer she doesn't seem to do anything.	1.8	0.0	3.6	65.5	29.1
4. The nurse gives directions at just the right speed.	40.0	58.2	0.0	1.8	0.0
5. I wish the nurse would tell me more about my physical condition than she does.	1.8	7.3	16.4	49.1	25.5
6. Too often the nurse thinks you can't understand the explanation of how to care for yourself so she just doesn't bother to explain.	1.9	0.0	1.9	53.7	42.6
7. The nurse gives directions too fast.	1.8	0.0	0.0	61.8	36.4
8. The nurse is understanding in listening to a patient's problem.	50.9	47.3	0.0	0.0	1.8
9. The nurse is too busy to spend time talking with me.	1.8	3.6	1.8	32.7	60.0
10. The nurse is pleasant to be around.	50.9	47.3	1.8	0.0	0.0
11. I'm tired of the nurse talking down to me.	3.6	0.0	0.0	50.9	45.5
12. The nurse is a person who can understand how I feel.	34.5	49.1	14.5	1.8	0.0
13. The nurse should be more friendly than she is.	1.8	3.6	1.8	49.1	43.6
14. Just talking to the nurse makes me feel better.	29.1	54.5	10.9	5.5	0.0

TABLE 14 (continued)

	Very Satisfied	Satis-fied	Un-decided	Unsat-isfied	Very Un-satisfied
1. Instructions regarding how to monitor my blood pressure.	74.5	25.5	0.0	0.0	0.0
2. Instructions regarding collecting and testing my urine.	72.7	27.3	0.0	0.0	0.0
3. Advice and instructions regarding maintaining bedrest.	63.6	34.5	1.8	0.0	0.0
4. Advice and instructions regarding diet and nutrition.	30.8	46.2	19.2	3.8	0.0
5. Instructions regarding counting and recording fetal movements.	65.5	32.7	1.8	0.0	0.0

	Too many	Just right	Not enough
6. The number of visits by the public health nurse was	7.4	92.6	0.0

	Easy	Undecided	Difficult
7. I found that getting enough bedrest was	60.0	20.0	20.0
8. I found that keeping records of bedrest, fetal movements, and blood pressure was	85.5	9.1	5.5
9. I found that keeping doctor's appointments was	89.1	9.1	1.8

instruction skills of the nurse. Patients were asked to rate the nurse on a scale from one to five, five indicating the highest level of satisfaction. Of those patients who responded, 81.8% rated the nurses at a mean level of four or above, indicating a high level of satisfaction with clinical instruction. The next seven questions were related to satisfaction with the interpersonal skills of the nurse. Slightly more than three quarters of subjects, i.e., 76.4% rated the nurses at a mean level of 4 or above, again indicating that the majority of patients were satisfied with the nurses' interpersonal skills.

When patient teaching was broken down into specific areas, mean scores were all in the satisfied to very satisfied range with very little variation between categories. In order of most to least satisfication, results were:

Instructions:	
on how to monitor blood pressure	4.75
on urine testing and collecting	4.73
regarding recording fetal movement counts	4.64
regarding bed rest	4.62
regarding diet and nutrition	4.08

Subjects were also asked to rate how easy or difficult it was to comply with various program requirements; 60.0% found it easy to meet bed rest requirements, 20.0% found it difficult, and 20.0% were undecided.

Record keeping of such parameters as blood pressure, urine tests and fetal movement counts was thought to be difficult by only 5.5% of the subjects. Eighty-five percent thought it was easy and 9.1% were undecided. Keeping doctors appointments was felt to be easy by 89.1% with only 1.8% finding it difficult. Clients found getting the required bed rest much more difficult than keeping records or attending doctors appointments.

When asked to rate the number of PHN visits, 92.6% were satisfied and felt the number of visits was just right, while four subjects (7.4%) felt that there were too many visits.

The final question asked of women on the program was whether they would use the program again if they found themselves in a similar situation. Two subjects (3.6%) said no, one (1.8%) was undecided and the vast majority, 94.5% indicated that they would use the program again.

Benefits

The responses of the subjects when asked to describe the benefits of being on the program are listed in Table 15. The most common response indicated that they felt more at ease, comfortable, and relaxed in their own homes. They indicated that they were more able to rest and felt less constrained at home. They pointed out that being allowed to remain at home as opposed to being in hospital was a major benefit. Substantiating this finding was the second most frequently mentioned benefit, "not being hospitalized." The third most common benefit was keeping the family together. Remaining with family members, including small children, was seen as beneficial. Eight subjects included the nursing care they received as a benefit. They found the nurses informative, caring and supportive. Three subjects indicated that a benefit of being cared for at home was the fact that their blood pressure was lower in the home. Several other benefits were mentioned less frequently such as daily monitoring, the opportunity to learn to take their own blood pressure readings, and that the program seemed to reinforce, for some clients, the importance of taking care of one's self.

The PHN team received several unsolicited letters from patients after they were discharged from the program. All of the letters complimented the PHNs and/or the program.

TABLE 15

PROGRAM BENEFITS

BENEFIT	N
More at ease/relaxing/comfortable at home	19
Not hospitalized	15
Family together	10
Staying at home	9
More freedom at home	5
Monitoring own BP reassuring	5
Nurses informative and supportive	4
Learning and taking responsibilty for own care	4
Daily monitoring	3
Able to rest better at home	3
Not alienate children	2
Familiar surroundings	2
Reassured by qualified care	2
Husband shares in program	2
Discussing problems/changes with nurse	2
Don't get bored at home	1
Medical excuse for rest	1
Felt more in control	1
Having nurse come in	1
Less depressing at home	1
Very good care	1
Well being taken care of	1
Able to maintain home	1
BP up when in Dr.'s office	1
BPs lower at home	1
Homemaker to do housework	1
Early problem detection	1
More personal care	1
Less trips back and forth	1
Feel better on program	1
None	1

Difficulties

Subjects delineated far fewer difficulties than benefits of the program (see Table 16). The most frequently mentioned difficulty was the conflict of need for rest versus household duties and chores. Subjects indicated feeling "helpless just lying about." They mentioned that they found it hard to relax, hard to organize their lives around the program, and one woman found it difficult to continue to care for her son. Equipment problems were mentioned by four subjects and three women felt that it was difficult and time-consuming to do the monitoring, particularly fetal movement counts.

Having no set time for PHN visits was a difficulty and five clients mentioned the visits as problematic: the visits took up rest time, one woman felt her blood pressure became elevated as a result of the visits, and one complained of conflicting advice between physician and nurse. The final area of difficulty was emotional in nature. Women felt "isolated", "tied down", and disliked having to remain at home "doing nothing."

Suggested Changes

Suggested changes to the program were few in number and are presented in Table 17. The most frequently suggested change was to have public health nurses visit at a designated time each day. Presently nurses make visits at varying times due to their schedules and the location of the client's home. It appeared that six clients would have preferred a pre-arranged time for visits consistent from day to day. Three clients suggested fewer visits which is consistent with the rated question in a previous section of the questionnaire in which only four out of the total number of respondents indicated that the frequency of visits was "too many."

Two subjects suggested that the public health nurse who cared for a patient while she was on the program should also provide follow-up care

TABLE 16

DIFFICULTIES ASSOCIATED WITH BEING ON THE PROGRAM

DIFFICULTY	N
None	24
Hard not to do too much	7
Equipment problems	4
No set time for PHN visit	3
Getting in the rest time	3
Falling asleep counting fetal movements	2
Organising lifestyle around program	2
Tied down at nome	2
Having to relocate for program	2
Delegating duties	1
Dilemma between rest and duty	1
Time consuming	1
Being up and ready for nurse	1
More rest at home vs hospital	1
Getting to Dr.'s appointments	1
No money to get to hospital in an emergency	1
Hard to keep track of information	1
Conflicting advice from PHN & MD	1
Resisting people's long visits	1
Depending on others	1
PHN visits hard on nerves	1
Hard to follow diet	1
Going to bed earlier at night	1
Felt isolated	1
Preparing meals	1
Caring for son	1

TABLE 17

SUGGESTED CHANGES TO THE PROGRAM

CHANGE	N
None	33
More regular times for visits	6
Less than three nurses visiting	2
Decrease number of visits	2
Some nurses have not experienced labour and delivery	1
Have program nurse do postnatal visit	1
Shorter visits	1
Less repetition	1
Found daily appointments tiring	1
No daily visits if normal	1
Inform MD BP up in office vs home	1
BP follow-up after discharge	1

during the post-partum period and/or after being discharged from the program. nother change suggested by two subjects was to have the same number of visits but fewer nurses doing the visiting so each client would have fewer nurses to relate to. Additional suggestions included (a) making the visits shorter in time, as one client found them tiring; and (b) improving communication between physician and nurse, specifically so that discrepancies in the values of blood pressures taken at home and in the doctor's office would be noted by both parties.

Home Supports

Home support data were collected to describe the patient's home support systems. When asked to indicate the three most supportive people in their lives, patients most frequently mentioned husbands, 93%; mothers, 63%; sisters, 50%; friends, 43%; and fathers, 28%. Others also mentioned as supportive were in-laws, aunts, and social workers. The frequency of contact and the patient's ability to share her problems with each support person are indicated in Table 18.

In summary, the majority of clients on the home care program had daily contact with a husband who was perceived as supportive and had a relationship in which they could always share their problems. Other family members were seen as supportive, but contact was not as frequent and the ability to share problems with these others was less.

There was only one subject who did not have daily contact with at least one support person; however she saw a minister weekly with whom she was always able to share her problems.

Anxiety

Scores ranged from 20 to 60 on the Spielberger State Anxiety Inventory, with a mean score of 32.63. When anxiety scores for home care subjects were compared with a similar group of hospitalized subjects diagnosed

TABLE 18

SUPPORT PERSONS, FREQUENCY OF CONTACT AND ABILITY TO SHARE PROBLEMS

	FREQUENCY OF CONTACT					ABILITY TO SHARE PROBLEMS		
PERSON	DAILY	WEEKLY	SEVERAL /MONTH	SEVERAL /YEAR	YEARLY	ALWAYS	OCCASION-ALLY	NEVER
Husband/ Partner	46(4)[1]	1				49	1	1
Mother	12	14(1)	2(2)	3	1	20	14	
Father	7	5	1	1	1	9	5	1
Sister	8	12	6	3		26	3	
Brother			1				1	
Other Relative	1	1	1				3	
Friend	2	11	8	2		13	9	1
Counsellor etc.[2]	3	2	1			5	2	

[1] Figures in parentheses indicate telephone contact.

[2] This group included social workers, therapists, ministers, PHNs and homemakers.

with pregnancy induced hypertension (Becker, 1984), the mean score for the hospitalized group was higher at 39.68. These subjects completed the earlier version of the Inventory, Form X, which according to Spielberger (1983) is essentially equivalent for the assessment of anxiety. Unfortunately, since different versions of the form were used in the two groups of patients and patients were not randomised to hospital or home treatment, the valid application of any statistical tests is precluded.

When the mean anxiety score, 32.85, for those on the program is compared with normative data in the literature, results are comparable, and even lower than most norms. For instance, the norm for working adult women is 35.2; for female college students, 38.76; for female high school students, 40.54; and for women between the age of 19-39, 36.17 (Speilberger, 1983). It is interesting to note that the home care sample was below all of these norms whereas the hospitalized sample is higher than all but the female high school student group. This is particularly important when you consider the emotional turmoil associated with high-risk pregnancy.

Administration

Several administrative aspects were examined. These aspects were PHN workload, staffing, and costs.

Public Health Nurse Workload

The public health nurses' activities were grouped into seven categories:

1) Health Assessment - General History
2) Health Assessment - Program Clinical
3) Prenatal Education - General
4) Prenatal Education - PIH-related
5) Travel

6) Case coordination
7) Evaluation

PHNs recorded the time, in units of 10 minutes, spent in the various activity categories (Appendix L). The overall average percentage of time per patient spent in each program activity appears in Figure 1.

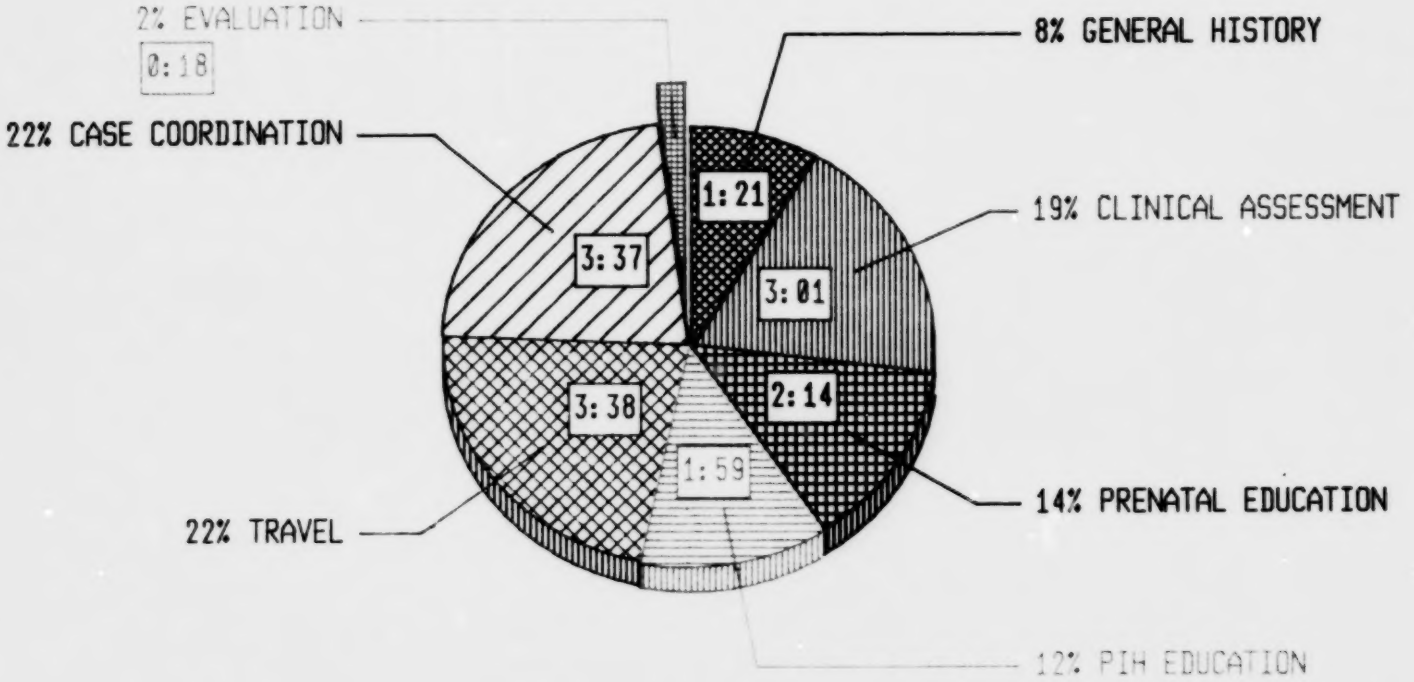
The PHNs felt that considerably less time was spent in program-related clinical health assessment in the second half of the pilot phase, compared to the first months. Increasing familiarity with the clinical procedures, organization of the sequence of the assessments, as well as with the equipment, were key factors. Episodic malfunctioning of the electronic sphygmomanometer resulted in an increased amount of time spent on clinical assessment.

The amount of time spent on General Prenatal Education varied with each client. Factors influencing this included whether or not the client had finished a series of prenatal classes prior to entering the program or if the client was allowed by her physician to continue to attend while on the program. Clients entering the program at 30-32 weeks gestation frequently were not allowed to start prenatal classes, or continue, as often their condition was severe enough that they were on a strict bedrest regime; these patients required considerable teaching time.

PIH Related Education took up a sizeable proportion, 14%, of the total time spent on the first three to five home visits. Providing information to the client about PIH was crucial in enabling her to monitor her own progress safely. Some clients needed more teaching time in this area than others, depending mainly on their general educational level and background.

A large proportion of PHN time, 22%, was spent on travel due to the fact that all of urban Winnipeg, including the area of the City of Winnipeg Health Department, was covered from one district office. Visits were

FIGURE 1
PERCENTAGE OF PHN HOURS PER PATIENT SPENT IN VARIOUS PROGRAM ACTIVITIES



consolidated within geographic areas on weekdays but this was not feasible on weekends. Table 19 displays the number of home visits by Public Health District.

Case Coordination required frequent communication with the Fetal Assessment Unit, the Satellite Laboratory and attending physicians in order to monitor the patient closely. At times, considerable difficulty in contacting the physician, delayed reports from the laboratory and inadequate feedback from the Fetal Assessment Unit resulted in increased time expenditure. The time spent attempting to keep the equipment in good working order, which involved frequent discussions with the medical supply company on specific mechanical problems, sending equipment in for repair, etc., was also included in the Case Coordination category.

Staffing

The program was staffed by four SYs (three full-time and two half-time), who concurrently were working in the Maternity Early Postpartum Discharge Program. Since both programs required seven-day-a-week coverage, all five PHNs rotated weekend duty.

A problem that was continually faced was the fluctuating workload typical in obstetrics. Often the referral rate to both programs (EPPD and PIH) would either be high or low, so the total workload varied considerably. An example of this is seen in comparing two successive months: there were 17 home visits for the PIH program made in February, 1986, as compared to 93 in March, 1986. Since it was very hard to predict the workload from one day to the next, staffing was not easily altered. As a result, staff often had heavy workloads with considerable overtime. On slow days they tried to assist other offices with regular postnatal follow-up. The latter depended on how much case coordination had to be done or if it was an initial home visit for the PIH Program. Providing field services was problematic as the PHNs might be able to

TABLE 19

Number of Home Visits by District of Residence of Clients

District		Number of Home Visits		
Winnipeg Region:	St. James/Assiniboia	54		
	Tuxedo/Charleswood	25		
	Fort Garry	33		
	St. Boniface/St. Vital	138		
	Transcona	25		
	West Kildonan	24		
	East Kildonan	92		
	Subtotal		391	
City Health:	East District	113		
	West District	53		
	North District	74		
	South District	53		
	Subtotal		293	
TOTAL				684

pick up on the workload one day, make appointments for the next day, only to have to cancel if the PIH program became very active.

Shortly after the PIH Program began, it was found that one PHN on the weekend was often unable to manage the workload. Therefore, an additional PIH team member was assigned to be on call. The workload for the weekend would usually be known by noon on Friday, and the need for the on-call PHN was determined at that time. Over the pilot project phase, the additional PHN was required approximately two out of three weekends. The payback time came from regular staffing hours of the program.

The usual number of home visits made in a day for the PIH and EPPD programs was three to four. However, the ability to manage this number without putting in overtime would vary with the type of visit required, the geographical distances between locations of home visits, and the amount of case coordination required. At times of heavy workload, the PHN would sometimes have to manage up to six home visits, which necessitated putting in overtime hours.

Costs of Equipment, Supplies, and Homemaker Support

Costs associated with program operation appear in Table 20. After a year both the electronic sphygmomanometers and Doptone machines started malfunctioning. It was felt that due to their sensitive electronic nature, these machines could not withstand long-term exposure to extremes of climate which occurred when they were being taken in and out of the PHN's car, or the numerous people who were handling them. All of these machines required replacement at an additional cost of $1,284.00 for six electronic sphygmomanometers and $1,000.00 for two Doptone machines.

Thirty hours of homemaker support were purchased from Family Services for two clients, one of whom received 10 hours and the other 20 hours,

TABLE 20

Costs of Equipment, Supplies, and Homemaker Support

	$	
Initial purchase of equipment:		
Portable adult weigh scales (6)	722.00	
Electronic sphygmomanometers (6)	756.00	
Fetal auscultation devices:		
Doptone machines (2)	1,500.00	
Pinard stethoscopes (7)	91.00	
Subtotal		3,069.00
Replacement costs of equipment:		
Electronic sphygmomanometers (6)	1,284.00	
Doptone machines (2)	1,000.00	
Subtotal		2,284.00
Ongoing supplies:		
Disposable aprons	234.00	
Chemstrips (urine reagent strips)	138.00	
Aquasonic gel (for use with Doptone machine)	144.00	
Subtotal		516.00
Miscellaneous:		
2 beepers (rented at $30.00/month x 1 year)	360.00	
2 reference binders for use in patient teaching (Childbirth Graphics Desk Reference - at $60.00 each)	120.00	
Pamphlets/education booklets:		
NAACOG "High blood pressure during pregnancy" (100)	35.00	
Patient Education Booklet (100)	20.00	
Subtotal		535.00
Homemaker Support:		240.00
TOTAL		$6,644.00

at a cost of eight dollars per hour. Although the costs incurred by Manitoba Health for homemaker support over the duration of the pilot project were only $240.00, it must be noted that a new patient who came onto the program after the pilot data collection phase required significantly more homemaker support at a cost of $1411.00.

Public Health Nurses' Response to the Program

The PHNs involved with service delivery were interviewed as a group regarding any problems encountered in providing service. Seven problematic areas were identified; these were:

1. the short lifetime, repair service accessiblity, and maintenance of a sufficient number of electronic sphygmomanometers and Doptones to meet service demands
2. delayed receipt of laboratory reports
3. incomplete information on patient status upon initial referral to the project, and as assessed by the Fetal Assessment Unit while on the project
4. inappropriate referrals to the project by virtue of unmet admission criteria or by referral made on weekend days
5. patients referred directly from physicians offices were insufficently informed about PIH, and particularly about symptoms of worsening PIH
6. client language barriers, emergency and non-emergency transportation needs, and availability of telephone service in the home
7. legal implications regarding non-compliant patients, and about patients referred to project on weekends upon hospital discharge.

While the five PHNs working in this program were adequately oriented to the program, they felt that they would benefit from continuing education on various aspects of PIH. A specific learning need identified was the appropriate utilization of laboratory and FAU reports in patient

management decisions. Regular attendance by the team and the clinical coordinator at in-hospital high risk obstetrical rounds was suggested as a means of meeting continuing educaton needs, and also of increasing communication between hospital and community health staff.

The specialized PHN team perceived the program as providing a new dimension of community health service, as well as one which was professionally satisfying.

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Appendix A

Community Based Management of Pregnancy Induced Hypertension
Patient Information Sheet

COMMUNITY BASED MANAGEMENT OF PREGNANCY INDUCED HYPERTENSION

PATIENT INFORMATION SHEET

You are cordially invited to participate in a study to evaluate the present system of medical and nursing care for patients with pregnancy induced hypertension. This study aims to provide safe and effective nursing care for you and your unborn child in the home environment. Specially trained nurses will visit you daily and periodically report your progress to your physician. Also, investigations will be performed in the home as would occur if you were hospitalized (i.e. urine and blood tests, blood pressure measurements). Should your blood pressure be significantly elevated, your physician may request that you be hospitalized.

This study will examine your opinions and reaction to your care. Your ideas, along with those of other patients, will be used to try to improve the care that you are now receiving. To achieve this we request that you fill out some questionnaires which will take about 20-30 minutes of your time (please do not place your name on any of the pages of these questionnaires, as all participants in the study will remain anonymous). You may decide not to participate and if you decide not to, it is perfectly acceptable for you to refuse. You may withdraw from the study at any time. This will not affect the care that you and your baby will receive.

The results will be based on group data, not individual questionnaires and may be published in the form of a journal article. The results of the study will be made available to you upon request.

You will receive a telephone call from a Research Assistant on the third day that the nurse visits you. She will ask for your consent to participate in this study and arrange an appointment to visit you if you decide to do so.

Steering Committee,
Community Based management of Pregnancy Induced Hypertension

Appendix B

Obstetrical Data Base

OBSTETRICAL DATA BASE

PRESENT PREGNANCY

G___ P___

LNMP_____ EDC_____

EDC by Ultrasound_____

Gestation:_____wks

Type of Contraception:

_____

Any Bleeding:_____1st

_____2nd_____3rd Trimester

Visits to FAU:_____

_____

Pre-Gravid Weight:_____

Present Weight:_____

Height:_____

Smoke:____ How Many?_____

Alcohol:___ How Much?_____

Other Medications:_____

_____

Rh:_____

Prenatal Care:_____

Prenatal Classes:_____

Breast Feeding:_____

Nipples:_____

_____

Infant's Physician:_____

_____

Recent exposure to a communicable disease or infection?_____

_____

SOCIAL HISTORY

Keeping Baby?_____

Referral:

Social Worker:_____

Social Agency:_____

Name of Support Person:_____

_____

_____

HISTORY OF PREVIOUS PREGNANCY

	YR	SEX	BW	HOSP	TYPE OF DELIVERY
1.					
2.					
3.					
4.					
5.					
6.					
7.					

HISTORY OF ILLNESS AND HOSPITAL ADMISSION

REVIEW OF SYSTEMS

Vision ___ NAD _____

Hearing ___ NAD _____

Communication

___ No Difficulty

Language Spoken_____

Respiratory

___ No Difficulty

TB_____ ASTHMA_____

Cardiovascular System

___ NAD

Hypertension:_____

Oedema_____ Anemia_____

Varicosities_____

D.V.T._____

CARDIAC DISEASE_____

Gastro Intestinal

___ NAD

Hepatitis B:_____

Genito Urinary

___ NAD

U.T.I.___ Proteinuria___

Endocrine:

___ No Difficulty

Diabetes ___ Thyroid ___

Skin ___ NAD

Musculo Skeletal

___ NAD

CNS ___ No Difficulty

Seizures _____

Mental/Emotional Problems:_____

_____

_____

Allergies ___ None Known

Food:_____

Drug:_____

OTHER:_____

Type of Reaction:_____

_____

Nursing Impressions:_____

_____

_____

SIGNATURE:_____

DATE:_____

ADDITIONAL INFORMATION:_____

_____

_____

_____

_____

Appendix C

Antepartum Patient Teaching Guide

Antepartum Patient
Teaching Guide

Name: _____

	Instruction					Assessment		Date	Init.
						Patient verbalizes and/or demonstrates understanding of instructions			
						Yes	No (Comment)		
I. ANTENATAL PROGRAM									
1. Introduction & Signs & Symptoms PIH									
2. Self-monitoring blood pressure and physiology of same									
3. Urine testing/24 hr. urine/daily weight									
4. Bed rest - note, amount, position									
5. Fetal movements & documentation									
II. General Prenatal Teaching									
1. Nutrition - maternal & breast feeding									
2. Smoking, alcohol, drugs, coffee									
3. Relevant anatomy and physiology									
4. Exercise									
5. Physical & emotional changes - 3rd trimester - comfort measure									
6. Changes in lifestyle and communication									
7. Relaxation technique - why, how, positions									
8. Breathing technique - concept and levels									
III. Labour and Delivery									
1. Signs & symptoms of labour and admission procedures									
2. Stages of labour									
3. Induction and fetal monitoring									
4. Analgesia/anesthesia/epidural, drugs									
5. Concept of pain tolerance									
6. C/S - indication, procedure, post operative care									
7. Immediate care of mother & babe									
8. Hospital tour									
IV. Postpartum									
1. Basic needs of infant - layette, safety, feeding.									

Appendix D

Scale for Assessment of Edema (Pretibial)

SCALE FOR ASSESSMENT OF EDEMA (PRETIBIAL)

1+ - slight indentation disappears rapidly.

2+ - indentation disappears in 10 - 15 seconds.

3+ - deep indentation that disappears in 1 - 2 minutes.

4+ - marked indentation that disappears in 5 or more minutes.

From: Billings and Stokes. Medical Surgical Nursing. C.V. Mosby Co., St. Louis, 1982.

Appendix E

Scale for Assessment of Reflexes

SCALE FOR ASSESSMENT OF REFLEXES

0 - absent, no response

1+ - decreased, diminished, sluggish

2+ - normal, average

3+ - brisk

4+ - very brisk, hyperactive; usually associated with clonus

From: Varney, Helen. Nurse Midwifery. Blackwell Scientific Pub., Boston, 1980.

Appendix F

Community Based Management of Pregnancy Induced Hypertension
P.H.N.'s Flowsheet

COMMUNITY BASED MANAGEMENT OF PREGNANCY INDUCED HYPERTENSION

Manitoba Health

P.H.N.'S FLOWSHEET PATIENT'S NAME _____ PATIENT'S I.D. # _____

PATIENT'S ADDRESS

_____

_____

_____

PHONE _____

PHYSICIAN'S NAME _____

PHONE _____

B NUMBER _____

CONSULTING PHYSICIAN _____

EXPECTED DATE OF CONFINEMENT _____ YR MO DA

FUNDAL HEIGHT (cm) _____

M.H.S.C. NUMBER _____

NURSE'S ASSESSMENT	DAY ____ DATE YR MO DA	DAY ____ DATE YR MO DA	DAY ____ DATE YR MO DA	DAY ____ DATE YR MO DA	DAY ____ DATE YR MO DA	DAY ____ DATE YR MO DA	DAY ____ DATE YR MO DA
Gestational Age							
Headache							
Visual Disturbance							
Nausea or Vomiting							
PV bleeding or discharge							
Abdominal pain							
Urinary Symptoms							
Weight Kg							
Pretibial Edema (0 - 4)							
Reflexes (0 - 4)							
BP Sitting	/	/	/	/	/	/	/
BP L. lateral							
Presentation							
Fetal Heart Rate							
Total FM Count							
Total Hours Bed Rest							
URINALYSIS							
Glucose							
Protein							
Ketones							
Physician Consult							
Physician Visit							
Lab/Fetal Assessment							
COMMENTS (Signature)							

LABORATORY DATA Date _____ YR MO DA

Haemoglobin _____

Haematocrit _____

WBC (total) _____

Platelets _____

Serum Uric Acid _____

BUN _____

24 hour Protein _____

Serum Creatinine _____

Creatinine Clearance _____

SPECIAL INSTRUCTIONS:

MS-1981

Appendix G

Community Based Management of Pregnancy-Induced Hypertension
Patient Education Booklet

PROGRAM FOR

COMMUNITY BASED MANAGEMENT OF PREGNANCY — INDUCED HYPERTENSION

Developed by St. Boniface Hospital and Manitoba Health

Patient Education Booklet

	TELEPHONE
DR. _____	_____
FHN: _____	945-8966
PROGRAM COORDINATOR	
_____	235-3070
FETAL ASSESSMENT UNIT:	237-2855
LABOR & DELIVERY	237-2777

This program was established to allow pregnant women with pregnancy induced hypertension the opportunity to remain at home with the supervision of specially trained public health nurses. Not every pregnant woman with hypertension will be eligible for this program. It is up to your own doctor in consultation with the public health nurse to decide whether you can be managed at home rather than in hospital.

If you are eligible for the program and you wish to remain at home, a public health nurse (PHN) will see you on a daily basis to monitor your blood pressure and your baby's heart rates, as well as other things.
You will be taught how to take your own blood pressure, test your urine, keep track of your baby's movements, etc. This booklet will help you to remember these details.

You will also be seeing your own doctor once a week as well as going to the Fetal Assessment Unit once a week.

Please be sure to keep the telephone numbers listed on the inside cover of this booklet handy at all times in case of any problems.

When to call your doctor

If you develop any of the following symptoms you should contact your doctor immediately. Do not wait for the Public Health Nurse's visit. Keep his/her telephone number near your phone so that it will be readily available if you or your family should want it.

1) Blurred vision, sensitivity to light, spots in front of your eyes or difficulty seeing.

2) Headache - particularly in the front of your head.

3) Pain in your stomach, particularly if you have never experienced this before.

4) Blood pressure above 150/100 in sitting position or 140/90 in left lateral position.

5) Total fetal movements less than 10 in a day or if there is any unusual change in pattern.

Other symptoms that should be reported immediately if they occur are as follows:

1) Bleeding from the vagina.

2) Gush or trickle of fluid from the vagina.

3) Severe nausea/vomiting.

These are not necessarily related to your hypertension.

Monitoring your blood pressure

You will be asked to take your blood pressure with the automatic machine four times per day at the following times:

a) At the start of your morning rest period.

b) At the start of your afternoon rest period.

c) Just before or after supper.

d) At bedtime.

These times should be roughly the same each day whenever possible.

These blood pressure readings should be done in both sitting and lying positions at each time. The PHN will be in to check your blood pressure as well on her visit.

The PHN will show you how to take your own blood pressure using the following steps:

1. Sit down for 10 minutes before taking your blood pressure.

2. Place the armband on your right arm and rest your arm on a table or other supportive surface.

3. Inflate the armband with the hand bulb until the number on the machine is 30 above what the top number of your blood pressure is normally. Turn the switch "ON" and deflate the cuff slowly. Note the number at which the beeper sounds as well as stops.

4. Write this B/P reading on the "Patient's Recording Sheet" in the "Sitting B/P" column.

5. Leaving the armband on, lie down on your left side for 10 minutes before taking your B/P again.

6. Place your arm across your chest at heart level.

7. Inflate cuff as in No. 3.

8. Write this B/P reading in the "L. lateral B/P" column.

9. Refer to the instruction manual provided with the machine for further directions. The PHN will review this with you.

NOTE: If your B/P is over 150/100 in sitting position or above 140/90 in left lateral position, rest for a further 10 minutes and recheck it. If still high, call your doctor immediately.

Procedure for urine testing

1) Collect a fresh urine specimen in a clean, dry container. You may use a plastic cup or a clean glass jar.

2) Remove one strip from the bottle and replace the cap securely. Completely immerse the colored areas in the fresh urine and remove it immediately.

3) While removing the strip, run the edge against the rim of the container to remove excess urine. Hold the strip in a horizontal position to prevent possible mixing of the chemicals from adjacent colored areas or soiling the hands with urine.

4) Compare test areas to corresponding color charts on the bottle at the time specified on the label. Hold the strip close to the bottle and compare carefully. Keep unused strips in the proper container with the lid tightly screwed on.

5) Record your findings on the appropriate form.

The nurse will demonstrate the procedure before you will be expected to do it on your own.

Collecting a 24-hour urine specimen

For this test you will be collecting all your urine for a 24-hour period.

Begin the collection after the first time you pass urine in the morning.

Discard this first urine and note the time.

The next time you pass urine, put it into the container. For example: if you were starting at 9 A.M., you would pass urine at 9 A.M., discard it and collect all other specimens including the 9 A.M. urine the next day.

Each specimen should be collected in a clean container and added to the large container that the nurse will provide for you. The container with your urine in it must be kept in the refrigerator or kept cool with ice. At the end of the 24-hour period, the specimen together with the requisition, will be taken to the laboratory for analysis (satellite lab.).

REMEMBER: You must include all urine specimens except the first one, which you will discard. If some urine is missing, it will influence the end result, so please include all specimens. If you forget to save the urine, please indicate how many times this has occurred in a 24-hour period.

Make sure you pass your urine at the end of the 24-hour period and add this to the collection, as this completes it.

Counting fetal movements

Keep track of fetal movements three times a day:

a) In the morning at the start of your rest period.

b) In the early afternoon at the start of your rest period.

c) Just before or after supper.

Lie down on your side for half an hour.

During this time, count the number of fetal movements. Your baby does not have to make a huge, vigorous movement for you to be able to count it; any small movement can be counted.

Write down the number of fetal movements for each of the three periods in the recording chart provided.

At the end of the three time periods, add the total of the 3 times together.

NOTE: If total fetal movements are less than 10, or if there is any unusual change in pattern, please call your doctor.

If baby happens to be active at other times of the day, there is no need for concern.

Rest and Activity Guidelines

Getting enough rest is a very important factor in keeping your blood pressure within normal limits.

While you are at home, you should be resting for at least 5 hours during the day and 10 hours at night. The 5 hours during the day can be divided up in one of two ways, as follows:

1) a morning and afternoon rest period... or
2) a morning, afternoon and evening rest period.

You are allowed some flexibility in the amount of time allocated to each rest period, however, you must have a minimum of 1 hour rest in each and a total of 5 hours in all.

When you are resting during the day, you should be lying down either on your left or your right side (never on your back) for the total time period. Try to keep the house as quiet as possible during this time and minimize distractions, so that you will be able to benefit totally from the period of rest. Quiet activities such as reading or watching T.V. are fine. Avoid having to get up during these rest periods to change channels or answer the phone. During the time you are up, minimize climbing stairs, standing for any length of time, i.e. washing dishes or any heavy housework.

If you are finding that you are unable to rest at home, discuss it with your PHN and your doctor. They may be able to suggest ways that will help you achieve the amount of rest you should have.

If you are normally a physically active woman, you may partake in mild exercise for ½ hour, twice a week. If you have any questions regarding this, please speak with your physician or the PHN.

NOTE: Record the amount of rest per day on the appropriate form.

Organization of your day

The activities that have been outlined in this booklet do not have to be done at an exact time, but should be done at approximately the same time each day. A guideline as to what order they should be done is as follows:

1) Get up in the morning -
   - record overnight rest hours
   - test urine using dipstick
   - weigh yourself.

2) Have breakfast.

3) Have your morning rest period -
   - take 1st B/P reading 10 minutes after sitting down and then repeat after lying down for 10 minutes.
   - then do 1st fetal movement count for 1 hour.
   - continue to rest for a minimum of 1 hour. (Note that the time taken to measure your B/P and to count your baby's movement may be included in your rest time).

4) Have lunch.

5) Have your afternoon rest period -
   - take your 2nd B/P reading 10 minutes after sitting down and then repeat after lying down for 10 minutes.
   - then do 2nd fetal movement count for ½ hour.
   - continue to rest for a minimum of 1 hour.

6) Take 3rd B/P reading and 3rd fetal movement count before or after supper. Add up the 1st, 2nd and 3rd fetal movement counts and enter the total number in the space provided.

7) Have supper. Reminder: If 3rd B/P reading and 3rd fetal movement count were not done before supper, do them now.

8) Have evening rest period if needed to complete the minimum of 5 hours bedrest for the day.

9) Take 4th and final B/P reading at bedtime.

NOTE: Please record all this information as soon as you finish any procedure, on the recording chart provided.

Appendix H

Community Based Management of Pregnancy Induced Hypertension
Patient's Recording Chart

INSTRUCTIONS

Please record the date and the length of your overnight rest at the top of each column at the beginning of each day. Also include your weight in kilograms as well as the results of your urine test.

Your first blood pressure recording should be done 10 minutes after sitting down at the start of your morning rest period. After writing your 2 blood pressure readings (both sitting and left lateral) on this chart you should then count the number of fetal movements you feel for the next half hour. Be sure to check the time accurately and write down the number of movements. Continue to rest for a minimum of 1 hour. Note that the time taken to measure your blood pressure and to count your baby's movements may be included in your rest time. Please record the length of your rest in the space provided.

Your second blood pressure recording and second fetal movement count should be done at the start of your afternoon rest period and in exactly the same manner as the morning recording — again be sure to write down the numbers you get on this chart. Continue to rest for a minimum of 1 hour. Please record the length of your afternoon rest in the space provided.

The third blood pressure recording and third (final) fetal movement count should be done just before or after supper (early evening) and entered on the chart. You should then add up the first, second and third fetal movement counts and enter the total number in the space provided. If you decide to divide your total daily rest into 3 periods, take your final rest in the early evening and record the amount of time rested in the space provided. If you decide to take only 2 rest periods, write N/A (not applicable) in the "evening rest" box. Either way, the total number of hours that you rest during the day should add up to a minimum of 5 hours.

Your fourth and final blood pressure recordings should be done at bedtime, ten minutes after you get into bed. Remember to write it in on this chart.

COMMUNITY BASED MANAGEMENT OF PREGNANCY INDUCED HYPERTENSION

Manitoba Health

PATIENT'S RECORDING CHART

NAME _____ PATIENT'S I.D. # _____

M.H.S.C. # _____ B NUMBER _____

PATIENT'S RECORD	DAY ____ DATE YR MO DA	DAY ____ DATE YR MO DA	DAY ____ DATE YR MO DA	DAY ____ DATE YR MO DA	DAY ____ DATE YR MO DA	DAY ____ DATE YR MO DA	DAY ____ DATE YR MO DA
Overnight Rest # Hours							
Weight Kilograms							
Urine Testing Glucose							
Protein							
Ketones							
BREAKFAST							
1st B.P. Sitting							
1st B.P. L. lateral							
1st Fetal Movement Count							
Morning Rest # Hours							
LUNCH							
2nd B.P. Sitting							
2nd B.P. L. lateral							
2nd Fetal Movement Count							
Afternoon Rest # Hours							
SUPPER							
3rd Fetal Movemsnt Count							
3rd B.P. Sitting							
3rd B.P. L. lateral							
Evening Rest # Hours							
4th B.P. Sitting							
4th B.P. L. lateral							
Total Fetal Movements							

FOR INSTRUCTIONS ON TAKING MEASUREMENTS AND COMPLETING THIS FORM SEE REVERSE

MO 7981

Appendix I

Notification to District Public Health Office

Manitoba

Health

Community Services

Winnipeg Region
South East District

233 Provencher Boulevard
Winnipeg, Manitoba, CANADA
R2H 0G4

(204) 945-8966

RE: NAME: _____

ADDRESS: _____

PHONE #: _____

Dear

This is to inform you that the above-named person will be followed/is discharged by the Antenatal Home Care Program.

Should you have any questions, please do not hesitate to call me.

Yours truly,

Public Health Nurse
Phone: 945-8966

/gn

Appendix J

Community Based Management of Pregnancy Induced Hypertension

Evaluation Form for Pilot Project

NAME OF PRIMARY PHN:_____

COMMUNITY BASED MANAGEMENT OF PREGNANCY INDUCED HYPERTENSION
EVALUATION FORM FOR PILOT PROJECT

I DEMOGRAPHIC INFORMATION

N a) Patient's I.D. number _____ b) M.H.S.C. number _____ N

N c) Hospital chart number _____ d) Age _____ N

N e) Number of years of formal schooling _____

N f) Gravidity _____ g) Parity _____ N

N h) Number of children at home _____

N i) Ages of children at home in years

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
____	____	____	____	____	____	____	____	____	____

N j) Antenatal classes: Is patient
currently attending 1 ____
finished course 2 ____
stopped attending - while on progra 3 ____
plans to attend 4 ____
is not attending - & does not plan to 5 ____

k) Location of classes? N
Health Dept 1 ____
Private 2 ____
Hospital/Clinic 3 ____

l) Has patient attended antenatal classes for a previous pregnancy? N
Yes 1 ____
No 2 ____
N/A 3 ____

N m) Marital status:
married 1 ____
single 2 ____
divorced 3 ____
separated 4 ____
commonlaw 5 ____
other ____
please specify:
_____

N n) Home help available from ?

	Total hours per week	Number of days/week
husband/partner 1 ____	____	____
other relative 2 ____	____	____
hired help 3 ____	____	____
other ____	____	____

please specify:
_____

II CLINICAL INFORMATION

N a) Name of Primary Physician _____

R/A b) Prenatal Risk Score: initial _____ at 36 weeks _____ at delivery _____

N c) Patient admitted to program from hospital or physician's office?

hospital 1 _____
physician's office 2 _____

N d) Gestational age on entry to program: _____ weeks
(Physician's determination)

N e) Was patient receiving antihypertensives prior to pregnancy? Yes 1 _____
No 2 _____

- or prior to 28 weeks gestation? Yes 1 _____
No 2 _____

	N Baseline	N On referral to program	R/A On admission to hospital		R/A On onset of labour
			For PIH treatment	Final	
f) Blood pressure Systolic/Diastolic					
Sitting:	_____	_____	_____	_____	_____
left lateral:	_____	_____	_____	_____	_____
g) Mother's weight in Kilograms	_____	_____	_____	_____	_____
h) Edema Yes=1 No=2	_____	_____	_____	_____	_____
i) Hemoglobin	_____	_____	_____	_____	_____
j) Platelets	_____	_____	_____	_____	_____
k) Serum uric acid		_____	_____	_____	_____
l) Serum creatinine		_____	_____	_____	_____
m) Proteinuria from 24hr urine Yes=1 No=2		_____	_____	_____	_____
n) Creatinine Clearance		_____	_____	_____	_____

N o) While at home on the program, did the patient require antihypertensives and/or anticonvulsants:

Antihypertensives Yes 1 _____ No 2 _____ Anticonvulsants Yes 1 _____ No 2 _____

R/A p) Check if the following symptoms of PIH were present on admission to hospital:

	Hospital Admission	
	For PIH treatment	Final
Headache	_____	_____
Visual Disturbance	_____	_____
Epigastric pain	_____	_____
Hyperreflexia	_____	_____
Clonus	_____	_____

R/A q) Upon admission to hospital, did the patient require antihypertensives and/or anticonvulsants:

	Hospital Admission	
	For PIH treatment	Final
Antihypertensives	_____	_____
Anticonvulsants	_____	_____

III PROGRAM INFORMATION

N a) Reason(s) for termination of program (check all those which apply):

Patient normotensive: _____

Patient's B/P above baseline but stable: _____

Delivery: _____

Diastolic blood pressure 100 mm. Hg. or greater and/or
Systolic blood pressure 150 mm. Hg. or greater: _____

Diastolic blood pressure 15 mm. Hg. or more above baseline and/or
Systolic blood pressure 30 mm. Hg. or more above baseline: _____

Proteinuria 600 mg/dL or greater by 24 hour urine collection: _____

Unable to comply with: bed rest requirement: _____
q.i.d. blood pressure recording: _____
fetal movement recording: _____

Nurse's assessment of:-
symptoms: _____
psychosocial problem: _____
lack of home support: _____

Self initiated: _____

Reason for self initiated termination of program: _____

_____

Other reasons - please specify: _____

_____

N b) What other services was patient referred to?
Check all those applicable.

not referred _____
income security _____
family counsellor _____
home economist _____
other _____
please specify _____

N c) Family services: received Yes 1 _____
No 2 _____

If homemaker service received by patient, please give number of hours per week:

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8

R/A i) number of PHN visits:

Week 1 Week 2 Week 3 Week 4 Week 5 Week 6 Week 7 Week 8

R/A e) # of patient visits to attending physician after admission to program: ____

R/A f) # of patient visits to satellite laboratory after admission to program: ____

R/A g) # of patient visits to ultrasound after admission to program: ____

R/A h) Compliance score for recording fetal movement counts:

Week 1 Week 2 Week 3 Week 4 Week 5 Week 6 Week 7 Week 8

R/A i) Compliance score for recording blood pressure q.i.d.:

Week 1 Week 2 Week 3 Week 4 Week 5 Week 6 Week 7 Week 8

R/A j) Compliance score for recording weight daily:

Week 1 Week 2 Week 3 Week 4 Week 5 Week 6 Week 7 Week 8

R/A k) Compliance score for average daily hours of bedrest for week:

Week 1 Week 2 Week 3 Week 4 Week 5 Week 6 Week 7 Week 8

IV MATERNAL OUTCOME (Entire section to be completed by Research Assistant)

a) Blood Pressure at postpartum discharge _____

b) Drugs given: Parenteral antihypertensives: Yes 1 _____ No 2 _____ Parenteral magnesium sulphate: Yes 1 _____ No 2 _____

Parenteral anticonvulsives: Yes 1 _____ No 2 _____

c) Did complications develop? Yes 1 _____ No 2 _____

If complications developed please check all those that apply:

Eclampsia 1 _____

Disseminated intravascular coagulation 2 _____

Oliguria 3 _____

Other complications 4 _____ Code: _____

Please specify other complications: _____

_____

d) Date of admission to program: _____ YR MO DA

e) Date of discharge from program at home: _____ YR MO DA

f) Date of admission to hospital: (excluding final date) _____ YR MO DA

g) Date of discharge from hospital: (excluding final date) _____ YR MO DA

h) Date of final admission to hospital prior to delivery: _____ YR MO DA

i) Date of delivery: _____ YR MO DA

j) date of discharge after delivery: _____ YR MO DA

k) Other comments: _____

_____

_____

V PERINATAL OUTCOME (Entire section to be completed by Research Assistant)

a) Infant's chart number:_____

b) Admitted NICU: Yes 1 _____ Date: _____ Date Discharged NICU: _____
No 2 _____ YR MO DA YR MO DA

c) Reason for admission to NICU:_____

CODE:_____

d) Admitted Intermediate: Yes 1 _____ Date: _____ Date Discharged from Intermediate: _____
No 2 _____ YR MO DA YR MO DA

e) Reason for admission to Intermediate Nursery:_____

CODE:_____

VI VALUES WHEN HOSPITALIZED PRIOR TO ADMISSION TO PROGRAM
(Entire section to be completed by research assistant)

a) Blood pressure
Systolic/Diastolic

Sitting: ____

left lateral: ____

b) Mother's weight in Kilograms ____

c) Edema
Yes=1 No=2 ____

d) Hemoglobin ____

e) Platelets ____

f) Serum uric acid ____

g) Serum creatinine ____

h) Proteinuria from 24hr urine
Yes=1 No=2 ____

i) Creatinine Clearance ____

R/A k) Check if the following symptoms of PIH were present on admission to hospital:

Headache ____

Visual Disturbance ____

Epigastric pain ____

Hyperreflexia ____

Clonus ____

R/A l) Upon admission to hospital, did the patient require antihypertensives and/or anticonvulsants:

Antihypertensives ____

Anticonvulsants ____

Appendix K

Home Visit Questionnaires

CONSENT TO PARTICIPATE

I, _____ , agree to participate in the study to evaluate medical and nursing care of patients with pregnancy induced hypertension. I have read the letter of explanation and understand that in order to participate I am being asked to complete three questionnaires.

I know that I can decide not to complete the questionnaires at any time. If I decide not to participate, this will not change my care in any way.

_____

Signature of Respondent

_____

Signature of Research Assistant

_____

Date

SUPPORT SCALE

I.D. # _____

Date: _____

Please read the following list of people and indicate the three most supportive. Answer the two questions for each of these three by placing an "X" in the space provided.	How often do you see this person?						Can you share your problems with this person?		
	Daily	Once a Week	Several Times a Mo.	Several Times a Yr.	Once a Year	Never	Always	Occasionally	Never
Husband/Partner									
Mother									
Father									
Grandmother									
Grandfather									
Sister									
Sister									
Sister									
Brother									
Brother									
Brother									
Friend									
Friend									
Friend									
Counselor/Therapist									
Social Worker									
Minister/Priest/Rabbi									
Other(Aunts, Uncles, In-Laws, etc.)									

I.D. # _____

Date: _____

PATIENT SATISIFACTION QUESTIONNAIRE

This questionnaire contains a number of statements, each of which says something different about nurses. For each statement, decide how much you agree or disagree with the view expressed. Beside each statement you will find five words to use to describe your opinion. Check the one that best describes your opinion.

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1. The nurse explains things in simple language.	1	2	3	4	5
2. It is always easy to understand what the nurse is talking about.	1	2	4	4	5
3. The nurse asks a lot of questions, but once she finds the answers, she doesn't seem to do anything.	1	2	3	4	5
4. The nurse gives directions at just the right speed.	1	2	3	4	5
5. I wish the nurse would tell me more about my physical condition than she does.	1	2	3	4	5
6. Too often the nurse thinks you can't understand the explanation of how to care for yourself so she just doesn't bother to explain.	1	2	3	4	5
7. The nurse gives directions too fast.	1	2	3	4	5
8. The nurse is understanding in listening to a patient's problem.	1	2	3	4	5
9. The nurse is too busy to spend time talking with me.	1	2	3	4	5
10. The nurse is pleasant to be around.	1	2	3	4	5
11. I'm tired of the nurse talking down to me.	1	2	3	4	5
12. The nurse is a person who can understand how I feel.	1	2	3	4	5
13. The nurse should be more friendly than she is.	1	2	3	4	5
14. Just talking to the nurse makes me feel better.	1	2	3	4	5

Your answers to the following questions will assist us in determining how satisfied you are with the care you have received on the home care program. Please use the following rating scale by placing a check beside the number that best describes how you feel, from very satisfied to very unsatisfied.

How would you rate your satisfaction with the following aspects of the teaching you have received since being on the home care program?

	Very Satisfied	Satisfied	Undecided	Unsatisfied	Very Unsatisfied
1. Instructions regarding how to monitor my blood pressure.	1	2	3	4	5
2. Instructions regarding collecting and testing my urine.	1	2	3	4	5
3. Advice and instructions regarding maintaining bedrest.	1	2	3	4	5
4. Advice and instructions regarding diet and nuitrition.	1	2	3	4	5
5. Instructions regarding counting and recording fetal movements.	1	2	3	4	5

6. The number of visits by the public health nurse was	Too many ____	Just right ____	Not enough ____
7. I found that getting enough bed rest was	Easy _____	Undecided ____	Difficult ____
8. I found that keeping records of bed rest, fetal movements, and blood pressure was	Easy _____	Undecided ____	Difficult ____
9. I found that keeping doctors appointments was	Easy _____	Undecided ____	Difficult ____

What were the benefits of being on the home care program?

What were the difficulties with being cared for on the home care program?

What changes would you suggest to improve the home care program?

If you found yourself in a similar situation, would you choose to be cared for under this program again?

The original instrument was designed for use in outpatient clinic settings, therefore, three out of the 14 questions were slightly reworded to accomodate the change in setting from clinic to home. "I wish the nurse would tell me more about my physical condition than she does" replaced "I wish the nurse would tell me more about the results of my tests than she does", "The nurse is too busy to spend time talking to me" replaced "The nurse is too busy at the desk to spend time talking to me", and finally "Too often the nurse thinks you can't understand the explanation of how to care for yourself so she just doesn't bother to explain" replaced "Too often the nurse thinks you can't understand the medical explanation of your illness so she just doesn't bother to explain".

Appendix L

Public Health Nurse Daily Time Sheet Records

TIME SPENT ON VARIOUS PHN ACTIVITIES PER PATIENT VISIT

RECORD MULTIPLES OF TEN MINUTES ONLY

EMPLOYEE NO. _____

ACTIVITIES	Day Sun DATE YR MO DA	Day Mon DATE YR MO DA	Day Tues DATE YR MO DA	Day Wed DATE YR MO DA	Day Thur DATE YR MO DA	Day Fri DATE YR MO DA	Day Sat DATE YR MO DA
HEALTH ASSESSMENT History/ general							
Program/ Clinical							
PRENATAL EDUCATION General							
PIH							
TRAVEL							
CASE COORDINATION							
EVALUATION							
# OF CLIENTS SERVED							

Guidelines for Nursing Statistics
Community-Based Management of PIH

Health Assessment

a) History/General -

- includes initial nursing data base collected on all new referrals.
  - also ongoing data collected apart from the physical assessment.

b) Program/Clinical -

- the physical assessment done as part of the program on a daily basis.

Prenatal Education (Teaching/Anticipatory Guidance)

a) General -

- the type of general education given out on prenatal care, to replace what they would get in prenatal classes.
- any other teaching/counselling.

b) PIH -

- education given on content in education booklet developed for program, as well as relating to PIH in general.

Travel

- time spent travelling to an A/N patient, separated as much as possible from postnatal referrals (see attached for example).

Case Coordination

- arrangements for FAU/Lab./physician follow-up.
- consultation with attending physician, other professionals.
- general recording on chart/flow chart.

Evaluation

- time spent in the evaluation component of the program. i.e. getting information and filling out evaluation form.
- filling out rating scale for home assessment.
- any time spent with patient discussing evaluation component.

Example of figuring out travel time

OFFICE ⟶ 1. VISIT A ⟶ 2. VISIT B ⟶ 3. VISIT C ⟶ 4. OFFICE
(Antenatal) (Postnatal) (Antenatal)

Time recorded for A/N program:
(1) + (3) + (4) Exclude time (2)

- obviously only a rough guide.
- any other time, i.e. (2) would be recorded on regular nursing stat sheet.

NOTE: Any activities such as meetings with hospital/medical staff, i.e. Dr. Lange's meetings, high-risk rounds and meetings with program specialist re program administration would be included in general PHN stats.

Appendix M

Community Based Management of Pregnancy Induced Hypertension Protocol

COMMUNITY BASED MANAGEMENT OF PREGNANCY INDUCED HYPERTENSION

PROTOCOL

1) Patient referred from physician's office or from hospital to the Program PHN on call. The program PHN on call must notify the Research Assistant immediately a new patient is referred to the program and give her the patient's name, address, phone number, ID number and date of admission to the program.

2) Patient visits Satellite Laboratory, preferably on the day of referral or, alternatively, on the day after referral. A hospital chart number (B number) will be assigned to the patient at this time unless the patient was referred from hospital in which case they will already have a B-number and the initial visit to the Satellite Laboratory will not be necessary. For all patients, regardless of where they were referred from, there will be subsequent weekly visits to the Satellite Lab. which will be combined with a visit to the Fetal Assessment Unit on a specified day of the week.

3) A Public Health Nurse, who will be known as the patient's Primary PHN, is assigned and visits the patient within 24 hours of referral and thereafter visits daily. At the daily visits the PHN will fill out the PHN's Flowsheet with daily patient information and will ensure that the patient is recording information on the Patient Recording Chart.

4) On the first visit the Primary PHN should make sure that the patient has received an information sheet from her physician. If the patient does not have an information sheet the PHN should provide her with a copy. The patient should be made aware of the section on the information sheet relating to the evaluation component of the program so that she will be prepared for a telephone call from the Research Assistant.

5) The patient's chart (file) must be returned to the office at the end of each day so that records remain in a central location to ensure accessibilty. 6) On the second visit the PHN fills out the sections of the evaluation form marked N (R/A refers to the Research Assistant). The patient's Primary PHN will be responsible for ensuring that each patient's evaluation form is completed.

7) On the day of the 3rd PHN visit, the Research Assistant will phone the patient and confirm that they are willing to complete the various questionnaires. If the patient consents, the Research Assistant will make an appointment with the patient on the day of the 4th or 5th PHN visit, making sure not to conflict with the PHN visit or scheduled visits to the physician or the Laboratory/Fetal Assessment Unit.

8) When the Research Assistant visits the patient she will obtain the signed consent form and then give the questionnaires to the patient one at a time starting with the Anxiety questionnaire, then the Support questionnaire and finishing with the Patient Satisfaction questionnaire. After the patient has completed all questionnaires the Research Assistant will check that all have been completely filled out and ask the patient to complete any unanswered questions (unless the patient's intention was not to answer them).

9) The PHN continues to visit the patient and complete the flowsheet daily.

10) The program may terminate for a patient in one of 4 ways:-

    a) the patient becomes normotensive or her blood pressure stabilizes and she is discharged from the program.

    b) the patient's condition worsens and she is admitted to hospital for the treatment of PIH.

    c) the patient's condition worsens and she is admitted for immediate induction and delivery.

    d) the patient goes into spontaneous labour and delivers.

11) In the event of 10a there will be one post-discharge PHN visit.

12) Also in the event of 10a and in the event of 10b follow-up phone calls will be scheduled weekly thereafter (either to the patient's home for 10a or the ward for 10b) until the patient delivers. These phone calls will be the responsibility of the Primary PHN.

13) In the event of 10b the Primary PHN will notify the Research Assistant and she will complete the appropriate sections of the <u>current</u> evaluation form.

14) During follow-up of 10a, one of 4 events may occur:-

    a) the patient may be readmitted to the program from home.

    b) the patient's condition worsens and she is admitted to hospital for the treatment of PIH.

    c) the patient's condition worsens and she is admitted for immediate induction and delivery.

    d) the patient goes into spontaneous labour and delivers.

15) In the event of 14a the protocol restarts and a <u>new</u> evaluation form is started.

16) Also, in the event of 14b, Dr. Ian Lange will contact the patient's physician in order to ascertain the reason for not reassigning her to the program.

16) In the event of 14b follow-up phone calls will be scheduled weekly thereafter until the patient delivers. These phone calls will be the responsibility of the Primary PHN.

17) In the event of 14b the Primary PHN will notify the Research Assistant and she will complete the appropriate sections of the current evaluation form.

18) Also in the event of 10b or 14b there are 3 possible outcomes:-

   a) the patient is discharged home - not on the program.

   b) the patient is discharged home on the program.

   c) the patient delivers spontaneously or is induced while still in hospital

19) In the event of 18a the protocol restarts at point 12.

20) In the event of 18b the protocol restarts and a new evaluation form is started.

21) In the event of delivery, either spontaneous or induced, the Primary PHN will notify the Research Assistant who will obtain the remaining information for the evaluation form from the mother's and baby's charts one week after delivery (i.e. after the charts have been returned to Medical Records).